

This document gives pertinent information concerning the reissuance of the VPDES Permit listed below. This permit is being processed as a Major, Municipal permit. The discharge results from the operation of a 1.5 MGD wastewater treatment plant. This permit action consists of updating the proposed effluent limits to reflect the current Virginia WQS (effective January 6, 2011) and updating permit language as appropriate. The effluent limitations and special conditions contained in this permit will maintain the Water Quality Standards of 9VAC25-260 et seq.

1. Facility Name and Mailing Address: Basham Simms Wastewater Treatment Facility
221 S Nursery Ave
Purcellville, VA 20132
SIC Code : 4952 WWTP
Facility Location: 1001 South 20th Street
Purcellville, VA 20132
County: Loudoun
Facility Contact Name: Scott House
Chief Operator
Telephone Number: 540-338-4945
Facility E-mail Address: shouse@purcellvilleva.gov
2. Permit No.: VA0022802
Expiration Date of previous permit: February 18, 2015
Other VPDES Permits associated with this facility: VAN010016
Other Permits associated with this facility: Air 73671
E2/E3/E4 Status: Not Applicable (NA)
3. Owner Name: Town of Purcellville
Owner Contact/Title: Alex Vanegas
Director of Public Works
Telephone Number: 540-751-2314
Owner E-mail Address: avanegas@purcellvilleva.gov
4. Application Complete Date: August 14, 2014
Permit Drafted By: Alison Thompson
Date Drafted: 1/30/2015
Draft Permit Reviewed By: Doug Frasier
Date Reviewed: 2/3/2015
Second Review By: Joan Crowther
Date Reviewed: 2/18/2015
Public Comment Period : Start Date: 4/8/15
End Date: 5/8/15
5. Receiving Waters Information: See Attachment 1 for the Flow Frequency Determination
Receiving Stream Name : North Fork Goose Creek, UT
Stream Code: 1a-XAA
Drainage Area at Outfall: 0.81 sq.mi.
River Mile: 1.27
Stream Basin: Potomac River
Subbasin: Potomac River
Section: 9
Stream Class: III
Special Standards: None
Waterbody ID: VAN-A06R
7Q10 Low Flow: 0.0 MGD
7Q10 High Flow: 0.041 MGD (Dec-May)
1Q10 Low Flow: 0.0 MGD
1Q10 High Flow: 0.028 MGD (Dec-May)
30Q10 Low Flow: 0.0 MGD
30Q10 High Flow: 0.070 MGD (Dec-May)
Harmonic Mean Flow: 0.0 MGD
30Q5 Flow: 0.016 MGD

6. Statutory or Regulatory Basis for Special Conditions and Effluent Limitations:

<input checked="" type="checkbox"/> State Water Control Law	<input checked="" type="checkbox"/> EPA Guidelines
<input checked="" type="checkbox"/> Clean Water Act	<input checked="" type="checkbox"/> Water Quality Standards
<input checked="" type="checkbox"/> VPDES Permit Regulation	<input checked="" type="checkbox"/> Other (9VAC25-40)
<input checked="" type="checkbox"/> EPA NPDES Regulation	

7. Licensed Operator Requirements: Class I

8. Reliability Class: Class I

9. Permit Characterization:

<input type="checkbox"/> Private	<input checked="" type="checkbox"/> Effluent Limited	<input type="checkbox"/> Possible Interstate Effect
<input type="checkbox"/> Federal	<input checked="" type="checkbox"/> Water Quality Limited	<input checked="" type="checkbox"/> Compliance Schedule Required
<input type="checkbox"/> State	<input checked="" type="checkbox"/> Whole Effluent Toxicity Program Required	<input type="checkbox"/> Interim Limits in Permit
<input checked="" type="checkbox"/> POTW	<input checked="" type="checkbox"/> Pretreatment Program Required	<input type="checkbox"/> Interim Limits in Other Document
<input checked="" type="checkbox"/> TMDL	<input checked="" type="checkbox"/> e-DMR Participant	

10. Wastewater Sources and Treatment Description:

The current Basham Simms Wastewater Treatment Facility came online in March 2002. Prior to the construction of this facility, the Town operated an older wastewater treatment facility at a different site in the Town. That facility has been dismantled. When the facility at the current location came online, it had a design flow of 1.0 MGD. The facility received the Certificate to Operate (CTO) for the 1.5 MGD facility on September 16, 2010.

This is an advanced wastewater treatment plant with preliminary treatment and a membrane bioreactor (4-stage Bardenpho), followed by filtration and disinfection utilizing ultraviolet light. Over the past year, the average flow at the facility has been 0.6128 MGD.

See Attachment 2 for a facility schematic/diagram.

Three storm water outfalls for the Basham Simms WWTF were permitted under VPDES General Stormwater Industrial Permit VAR051442. A site review was conducted by DEQ staff on May 27, 2014 and by letter dated June 18, 2014 (Attachment 2) DEQ approved the no-exposure certification to the facility, so the VPDES General Permit for Storm Water Discharges Associated with Industrial Activity was not reissued.

TABLE 1 – Outfall Description

Outfall Number	Discharge Sources	Treatment	Design Flow(s)	Outfall Latitude and Longitude
001	Domestic and/or Commercial Wastewater	See Item 10 above.	1.5 MGD	39°07'09" 77°42'57"
See Attachment 3 for (Lincoln Quadrangle) topographic map.				

11. Sludge Treatment and Disposal Methods:

The Basham Simms WWTF utilizes gravity thickening and aerobic digestion to treat the sludge generated by the wastewater treatment processes. The biosolids are run through a belt press and are stored until they are picked up by a contractor for land application. The contractor is currently Recyc of Remington, VA. Recyc land applies the sludge under their land application permit.

12. Discharges, Intakes, Monitoring Stations, Other Items in Vicinity of Discharge

TABLE 2 – Other Items	
VA0026212	Town of Round Hill WWTP discharges to the headwaters of North Fork Goose Creek upstream of the confluence with the UT from the Basham Simms Wastewater Facility.
1aNOG005.69	DEQ's Ambient and Biological Water Quality Monitoring Station located on the North Fork Goose Creek at the Route 722 Bridge.

There are no public water supply intakes located within 5 miles of this discharge.

13. Material Storage:

TABLE 3 - Material Storage		
Materials Description	Volume Stored	Spill/Stormwater Prevention Measures
Ferric Chloride	5,000 gallons	Tank in contained area
Methanol	4,000 gallons	Tank in contained area
Citric Acid	1,500 gallons	Tank in contained area
Sodium Hypochlorite*	1,500 gallons	Tank in contained area
Polymer	250 gallons	Tank in contained area

* Used as needed to clean the membranes.

14. Site Inspection:

Performed by DEQ Compliance staff on September 10, 2014 (Attachment 4).

15. Receiving Stream Water Quality and Water Quality Standards:**a. Ambient Water Quality Data**

This facility discharges to an unnamed tributary to North Fork Goose Creek (streamcode XAA). The closest monitoring station is DEQ ambient and biological monitoring station 1aNOG005.69, at Route 722, approximately 5.2 miles downstream from Outfall 001. The following is the water quality summary for this segment of North Fork Goose Creek, as taken from the 2012 Integrated Report:

DEQ monitoring stations located on this segment of the North Fork Goose Creek:

DEQ ambient and biological monitoring station 1aNOG005.69, at Route 722.

E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. A fecal coliform TMDL for the North Fork Goose Creek watershed has been completed and approved.

Biological monitoring finds benthic macroinvertebrate impairments, resulting in an impaired classification for the aquatic life use. Citizen monitoring also indicates a medium probability of adverse conditions for biota.

The wildlife use is considered fully supporting. The fish consumption use was not assessed.

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b. 303(d) Listed Stream Segments and Total Maximum Daily Loads (TMDLs).**TABLE 4 - Information on Downstream 303(d) Impairments and TMDLs**

Waterbody Name	Impaired Use	Cause	Distance From Outfall	TMDL completed	WLA	Basis for WLA	TMDL Schedule
Impairment Information in the 2012 Integrated Report							
North Fork Goose Creek	Aquatic Life	Benthic Macroinvertebrates	1.27 miles	No	---	---	2022
	Recreation	<i>E. coli</i>		Goose Creek Watershed Bacteria 05/01/2003	4.14E+12 cfu/year fecal coliform bacteria 2.61E+12 cfu/year <i>E. coli</i> bacteria*	200 cfu/100 ml fecal coliform 126 cfu/100 ml <i>E. coli</i> * --- 1.5 MGD	---
Goose Creek Reservoir	Fish Consumption	PCBs	19.7 miles	No	---	---	2018
Goose Creek	Aquatic Life	Benthic Macroinvertebrates	20.8 miles	Goose Creek Watershed Benthic 04/26/2004	27.4 tons sediment/year**	TSS concentration 12 mg/L --- 1.5 MGD	---

* The WLA is expressed in the Goose Creek Watershed Bacteria TMDL as cfu/year fecal coliform bacteria.

** This facility was assigned a WLA for 91.5 tons/year of TSS in the Benthic TMDL for the Goose Creek watershed. The total WLA was calculated based upon the assumption of the facility operating at five times the design flow, and the permitted maximum average concentration for TSS (mg/L). The factor of five for the design flow was used in the TMDL as a conservative measure to build in future growth in the watershed. Although the future growth for the watershed was determined by the existing design flow of each facility in the watershed, the future growth is available for both new and expanding permits in the watershed. The actual WLA in the Benthic TMDL for this facility without including the future growth is 18.3 tons/year, based on a design flow of 1.00 MGD. Since the approval of the Benthic TMDL for Goose Creek, this facility has updated the maximum flow tier to 1.50 MGD. Using a portion of the available future growth allocation in the TMDL, the WLA for this facility is 27.4 tons/year of TSS based on the revised design flow of 1.5 MGD.

Significant portions of the Chesapeake Bay and its tributaries are listed as impaired on Virginia's 303(d) list of impaired waters for not meeting the aquatic life use support goal, and the draft 2012 Virginia Water Quality Assessment 305(b)/303(d) Integrated Report indicates that much of the mainstem Bay does not fully support this use support goal under Virginia's Water Quality Assessment guidelines. Nutrient enrichment is cited as one of the primary causes of impairment. EPA issued the Bay TMDL on December 29, 2010. It was based, in part, on the Watershed Implementation Plans developed by the Bay watershed states and the District of Columbia.

The Chesapeake Bay TMDL addresses all segments of the Bay and its tidal tributaries that are on the impaired waters list. As with all TMDLs, a maximum aggregate watershed pollutant loading necessary to achieve the Chesapeake Bay's water quality standards has been identified. This aggregate watershed loading is divided among the Bay states and their major tributary basins, as well as by major source categories [wastewater, urban storm water, onsite/septic agriculture, air deposition]. Fact Sheet Section 17.e provides additional information on specific nutrient limitations for this facility to implement the provisions of the Chesapeake Bay TMDL.

The planning statement is found in Attachment 5.

c. Receiving Stream Water Quality Criteria

Part IX of 9VAC25-260(360-550) designates classes and special standards applicable to defined Virginia river basins and sections. The receiving stream, North Fork Goose Creek, UT, is located within Section 9 of the Potomac River Basin, and classified as a Class III water.

At all times, Class III waters must achieve a dissolved oxygen (D.O.) of 4.0 mg/L or greater, a daily average D.O. of 5.0 mg/L or greater, a temperature that does not exceed 32°C, and maintain a pH of 6.0-9.0 standard units (S.U.).

The Freshwater Water Quality/Wasteload Allocation Analysis (Attachment 6) details other water quality criteria applicable to the receiving stream.

Some Water Quality Criteria are dependent on the temperature and pH and Total Hardness of the stream and final effluent. The stream and final effluent values used as part of Attachment 6 are as follows:

pH and Temperature for Ammonia Criteria:

The fresh water, aquatic life Water Quality Criteria for Ammonia are dependent on the instream temperature and pH. Since the effluent may have an impact on the instream values, the temperature and pH values of the effluent must also be considered when determining the ammonia criteria for the receiving stream. The 90th percentile temperature and pH values are used because they best represent the critical design conditions of the receiving stream.

The 7Q10, 30Q10, and 1Q10 of the receiving stream are 0.0 MGD. In cases such as this, effluent pH and temperature data may be used to establish the ammonia water quality criteria. Staff performed a limited review of the effluent data. Staff reviewed the maximum pH values reported on the Discharge Monitoring Reports from January 2011 through November 2014; the data can be found as part of Attachment 6. The 90th percentile pH was 8.0 S.U. for this time frame. With the last reissuance staff used a default value of 7.5 S.U. since the facility was new and there was limited effluent data from the newly upgraded facility. The pH value of 8.0 S.U. shall be used to establish the Ammonia Water Quality Criteria with this reissuance. A default temperature value of 25°C (annual) and 20°C (wet) shall be used since there is no current temperature data for the effluent.

Total Hardness for Hardness-Dependent Metals Criteria:

The Water Quality Criteria for some metals are dependent on the receiving stream's total hardness (expressed as mg/L calcium carbonate) as well as the total hardness of the final effluent.

The 7Q10 of the receiving stream is zero so no ambient data is available; therefore, the effluent data for total hardness can be used to determine the hardness-dependent metals criteria. Total hardness data from quarterly monitoring of the effluent as well as three additional samples taken as part of the Form 2A monitoring are available for analysis. The hardness-dependent metals criteria in Attachment 6 are based on an average effluent value of 137 mg/L. The summary of the effluent data is also found as part of Attachment 6.

Bacteria Criteria:

The Virginia Water Quality Standards at 9VAC25-260-170A state that the following criteria shall apply to protect primary recreational uses in surface waters:

E. coli bacteria per 100 ml of water shall not exceed a monthly geometric mean of the following:

	Geometric Mean ¹
Freshwater <i>E. coli</i> (N/100 ml)	126

¹For a minimum of four weekly samples [taken during any calendar month].

d. Receiving Stream Special Standards

The State Water Control Board's Water Quality Standards, River Basin Section Tables (9VAC25-260-360, 370 and 380) designates the river basins, sections, classes, and special standards for surface waters of the Commonwealth of Virginia. The receiving stream, North Fork Goose Creek, UT, is located within Section 9 of the Potomac Basin. This section has been designated with no special standards.

e. Threatened or Endangered Species

The Virginia DGIF Fish and Wildlife Information System Database was searched on August 14, 2014 for records to determine if there are threatened or endangered species in the vicinity of the discharge. The database indicated that the Green Floater is predicted within a 2 mile radius of the discharge. The limits proposed in this draft permit are protective of the Virginia Water Quality Standards and protect the threatened and endangered species found near the discharge. The database search as well as DGIF's response are found in Attachment 7.

DGIF suggested that the limitations be based on Environmental Protection Agency's (EPA) new, more stringent ammonia criteria that were adopted in August 2013. It is staff's best professional judgment that incorporation of these criteria into the Virginia Water Quality Standards is forthcoming, so once they are finalized, ammonia limitations will be recalculated at that time.

16. Antidegradation (9VAC25-260-30):

All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

During the last reissuance, the receiving stream was classified as Tier 1. This classification is still correct based on the following evaluation:

- 1) The facility discharges to a stream with critical stream flows of 0.0 MGD and at times the stream is comprised entirely of effluent. It is staff's opinion that streams comprised entirely of effluent are Tier 1.
- 2) North Fork Goose Creek was determined to be Tier 1 based on the stream model that predicted that the Water Quality Criteria of 5.0 mg/L for dissolved oxygen would just be met. The Tier 1 determination for this segment of the stream was also based on the background conditions from the Round Hill WWTP discharge (VA0026212) at the confluence of the two flows.
- 3) Two TMDLs have been written for the Goose Creek watershed; a TMDL for bacteria and one for benthic impairment.

Permit limits proposed have been established by determining wasteload allocations which will result in attaining and/or maintaining all water quality criteria which apply to the receiving stream, including narrative criteria. These wasteload allocations will provide for the protection and maintenance of all existing uses.

17. Effluent Screening, Wasteload Allocation, and Effluent Limitation Development:

To determine water quality-based effluent limitations for a discharge, the suitability of data must first be determined. Data is suitable for analysis if one or more representative data points is equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated.

Next, the appropriate Water Quality Standards (WQS) are determined for the pollutants in the effluent. Then, the Wasteload Allocations (WLA) are calculated. In this case since the critical flows 7Q10 and 1Q10 have been determined to be zero, the WLA's are equal to the WQS. The WLA values are then compared with available effluent data to determine the need for effluent limitations. Effluent limitations are needed if the 97th percentile of the daily effluent concentration values is greater than the acute wasteload allocation or if the 97th percentile of the four-day average effluent concentration values is greater than the chronic wasteload allocation. Effluent limitations are based on the most limiting WLA, the required sampling frequency, and statistical characteristics of the effluent data.

a. Effluent Screening:

Effluent data obtained from the permit application and Discharge Monitoring Reports (DMRs) has been reviewed and determined to be suitable for evaluation. The following pollutants require a wasteload allocation analysis:

Copper – This parameter was detected during the data submitted for the last reissuance and the facility has been monitoring it on a quarterly basis.

Zinc, Nickel, Phenol, and bis(2-Ethylhexyl)phthalate were detected during the expanded effluent testing completed as part of Application Form 2A.

Ammonia as N may be present since this is a wastewater treatment plant treating domestic wastewater.

b. Mixing Zones and Wasteload Allocations (WLAs):

Wasteload allocations (WLAs) are calculated for those parameters in the effluent with the reasonable potential to cause an exceedance of water quality criteria. The basic calculation for establishing a WLA is the steady state complete mix equation:

$$WLA = \frac{Co [Qe + (f) (Qs)] - [(Cs) (f) (Qs)]}{Qe}$$

Where:	WLA	= Wasteload allocation
	Co	= In-stream water quality criteria
	Qe	= Design flow
	Qs	= Critical receiving stream flow (1Q10 for acute aquatic life criteria; 7Q10 for chronic aquatic life criteria; 30Q10 for ammonia criteria; harmonic mean for carcinogen-human health criteria; and 30Q5 for non-carcinogen human health criteria)
	f	= Decimal fraction of critical flow
	Cs	= Mean background concentration of parameter in the receiving stream.

The water segment receiving the discharge via the outfall is considered to have a 7Q10, 30Q10, and 1Q10 of 0.0 MGD. As such, there is no mixing zone and the WLA is equal to the Co.

c. Effluent Limitations Toxic Pollutants –

9VAC25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Those parameters with WLAs that are near effluent concentrations are evaluated for limits.

The VPDES Permit Regulation at 9VAC25-31-230.D requires that monthly and weekly average limitations be imposed for continuous discharges from POTWs and monthly average and daily maximum limitations be imposed for all other continuous non-POTW discharges.

1) Ammonia as N:

Staff reevaluated the effluent pH and has concluded it is different than what was used previously to derive ammonia criteria. As result, staff used the new data to determine new ammonia water quality criteria and new wasteload allocations (WLAs). The statistical analysis performed with the new WLAs shows that the monthly average limit should be changed from 2.3 mg/L to 1.7 mg/L (See Attachment 8 for the current and new statistical evaluations). DEQ guidance suggests using a sole data point of 9.0 mg/L for discharges containing domestic sewage to ensure the evaluation adequately addresses the potential for ammonia to be present in the discharge containing domestic sewage.

Since this facility also has a monthly average TKN limitation of 5.0 mg/L and an annual average Total Nitrogen concentration limit of 4.0 mg/L, it is staff's best professional judgment that the current limit of 2.3 mg/L be carried forward with this reissuance.

Also, the Environmental Protection Agency (EPA) finalized new, more stringent ammonia criteria in August 2013; possibly resulting in significant reductions in ammonia effluent in NPDES Discharge Permits. It is staff's best professional judgment that incorporation of these criteria into the Virginia Water Quality Standards is forthcoming. This and many other facilities may be required to comply with these new criteria during their next respective permit terms, so any minor changes in the Ammonia as N effluent limitations would be counterproductive to the new EPA ammonia criteria.

2) Phenol/Bis(2-Ethylhexyl)phthalate:

Phenol was detected in two of three effluent samples collected as part of Application Form 2A Expanded Effluent Testing. The sample collected on May 15, 2014 had a concentration of 35 ug/L. The sample collected on June 3, 2014 had a concentration of 67 ug/L. The Human Health Criteria for Phenol is 870,000 ug/L. It is staff's best professional judgment that there is no reasonable potential to exceed this criteria and no further monitoring is necessary.

Bis(2-Ethylhexyl)phthalate was detected in the July 8, 2014 effluent sample collected as part of Application Form 2A Expanded Effluent Testing. The concentration was 5.5 ug/L. The Human Health Criteria for Bis(2-Ethylhexyl)phthalate is 22 ug/L. Staff does not believe a limit is warranted at this time, but will have the permittee monitor for this parameter on a semiannual basis during the next permit term. The additional data will be evaluated for a limit with the next reissuance.

3) Zinc/Nickel/Selenium:

The expanded effluent testing performed as part of the application Form 2A had detectable concentrations for Zinc, Nickel and Selenium.

Detectable concentrations for Zinc were found in the three effluent samples collected as part of Application Form 2A Expanded Effluent Testing. The concentrations were 37 ug/L on May 15, 2014, 32.6 ug/L on June 3, 2014, and 31.1 ug/L on July 8, 2014. The limit evaluation is found in Attachment 9. The evaluation showed that no limits are necessary for Zinc; therefore, no further monitoring will be required during the next permit term.

Detectable concentrations for Nickel were found in two of the three effluent samples collected as part of Application Form 2A Expanded Effluent Testing. The concentrations were 5.4 ug/L on June 3, 2014, and 5.2 ug/L on July 8, 2014. The limit evaluation is found in Attachment 9. The evaluation showed that no limits are necessary for Nickel; therefore, no further monitoring will be required during the next permit term.

A detectable concentration for Selenium was found in one of the three effluent samples collected as part of Application Form 2A Expanded Effluent Testing. The concentration on July 8, 2014 was 15 ug/L. The limit evaluation is found in Attachment 9. The evaluation showed that a monthly average limit of 7.3 ug/L is necessary for Selenium. Since there was only one sample with a detectable concentration, the reissued permit will have the permittee monitor for this parameter on a semiannual basis during the next permit term. The additional data will be evaluated for a limit with the next reissuance.

4) Copper:

There were detectable concentrations of Copper in the final effluent samples reviewed as part of the last reissuance. The facility was in the middle of an upgrade, so staff had the facility conduct quarterly monitoring for copper during the current permit term; the results are presented in Attachment 10. The results were statistically evaluated (Attachment 10) and demonstrate that a limit of 18 ug/L is necessary to protect the receiving stream. The facility will be given a compliance schedule to meet this new effluent limitation.

d. Effluent Limitations and Monitoring – Conventional and Non-Conventional Pollutants

No changes to dissolved oxygen (D.O.), carbonaceous biochemical oxygen demand-5 day (CBOD₅), total suspended solids (TSS), Total Kjeldahl Nitrogen (TKN), and pH limitations are proposed.

With the 2007 permit modification, staff decided to rerun the D.O. model for the existing conditions for the North Fork Goose Creek, i.e., Basham Simms at 1.0 MGD and Round Hill STP (VA0026212) at 0.5 MGD. The two model runs for this scenario are found in Attachment 11. The model used is a steady state stream D.O. model based on the belief that the discharge is continuous in nature. The model runs used the current flows and limitations for D.O., CBOD₅, and TKN. Staff used the same assumptions and stream characteristics that were used in the original modeling with one exception; the North Fork Goose Creek was originally broken into 3 segments – Round Hill discharge to the waterfall, the waterfall to the UT containing the Basham Simms discharge, and the UT to the end of the model. This time, staff decided to segment the North Fork Goose Creek into two segments – Round Hill to the UT, and the UT to the end. The model already captures the change in elevation which affects the re-aeration rate. This is a conservative approach since this version does not assume 100% saturation resulting from the waterfall, and it is staff's best professional judgment that water quality will be protected.

Model Run #1 established the conditions for the UT that is the receiving stream for the Basham Simms discharge. The segment 1 end values were used as input values for segment 2 of Model Run #2.

Model Run #2 demonstrates that the minimum water quality criterion for D.O. is met.

Expansion of Basham Simms and Round Hill

Since the 1.5 MGD tier was new in 2007, staff ran the Regional Dissolved Oxygen Model to determine the limitations for the 1.5 MGD flow tier. The results of the model runs are found in Attachment 12.

Model Run #3 established the conditions for the UT that is the receiving stream for the Basham Simms 1.5 MGD discharge. The segment 1 end values were used as input values for segment 2 of Model Run #4 and #5. It was determined that the following concentration limitations are necessary at the 1.5 MGD flow tier to protect water quality criteria for D.O.: D.O. (6.5 mg/L), CBOD₅ (10 mg/L), and TKN (5.0 mg/L).

Model Run #4 has Basham Simms at 1.5 MGD and Round Hill at 0.5 MGD. Model Run #4 demonstrates that the minimum water quality criterion for D.O. is met.

Model Run #5 looked at the stream conditions when Round Hill expands to 0.75 MGD. Model Run #5 demonstrates that the minimum water quality criterion for D.O. is met.

It is staff's practice to equate the Total Suspended Solids limits with the CBOD₅ limits. TSS limits are established to equal BOD₅ limits since the two pollutants are closely related in terms of treatment of domestic sewage.

pH limitations are set at the water quality criteria.

E. coli limitations are in accordance with the Water Quality Standards 9VAC25-260-170.

e. Effluent Annual Average Limitations and Monitoring – Nutrients

VPDES Regulation 9VAC25-31-220(D) requires effluent limitations that are protective of both the numerical and narrative water quality standards for state waters, including the Chesapeake Bay.

As discussed in Section 15, significant portions of the Chesapeake Bay and its tributaries are listed as impaired with nutrient enrichment cited as one of the primary causes. Virginia has committed to protecting and restoring the Bay and its tributaries. Only concentration limits are now found in the individual VPDES permit when the facility installs nutrient removal technology. The basis for the concentration limits is 9VAC25-40 - *Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed* which requires new or expanding discharges with design flows of ≥ 0.04 MGD to treat for TN and TP to either BNR (Biological Nutrient Removal) levels (TN = 8 mg/L; TP = 1.0 mg/L) or SOA (State of the Art) levels (TN = 3.0 mg/L and TP = 0.3 mg/L).

This facility has also obtained coverage under 9VAC25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia*. This regulation specifies and controls the nitrogen and phosphorus loadings from facilities and specifies facilities that must register under the general permit. Nutrient loadings for those facilities registered under the general permit as well as compliance schedules and other permit requirements, shall be authorized, monitored, limited, and otherwise regulated under the general permit and not this individual permit. This facility has coverage under this General Permit; the permit number is VAN010016. Total Nitrogen Annual Loads and Total Phosphorus Annual Loads from this facility are found in 9VAC25-720 – *Water Quality Management Plan Regulation* which sets forth TN and TP maximum wasteload allocations for facilities designated as significant discharges, i.e., those with design flows of ≥ 0.5 MGD above the fall line and > 0.1 MGD below the fall line.

Monitoring for Nitrates + Nitrites, Total Kjeldahl Nitrogen, Total Nitrogen, and Total Phosphorus are included in this permit. The monitoring is needed to protect the Water Quality Standards of the Chesapeake Bay. Monitoring frequencies are set at the frequencies set forth in 9VAC25-820. Annual average effluent limitations, as well as monthly and year to date calculations, for Total Nitrogen and Total Phosphorus are included in this individual permit. The annual averages are based on the technology installed as part of the WQIF grant funding and on 9VAC25-40 and GM07-2008.

f. Effluent Limitations and Monitoring Summary:

The effluent limitations are presented in the following table. Limits were established for CBOD₅, Total Suspended Solids, Ammonia as N, TKN, pH, Dissolved Oxygen, *E. coli*, Total Nitrogen, Total Phosphorus, and Total Recoverable Copper. Monitoring was established for Flow, Bis(2-Ethylhexyl)phthalate, Selenium, Total Hardness, Nitrate+Nitrite, and Whole Effluent Toxicity.

The mass loading (kg/d) for monthly and weekly averages were calculated by multiplying the concentration values (mg/L), with the flow values (in MGD) and a conversion factor of 3.785.

The mass loading (lb/d) for TKN monthly and weekly averages were calculated by multiplying the concentration values (mg/L), with the flow values (in MGD) and a conversion factor of 8.345.

Sample Type and Frequency are in accordance with the recommendations in the VPDES Permit Manual.

The VPDES Permit Regulation at 9VAC25-31-30 and 40 CFR Part 133 require that the facility achieve at least 85% removal for CBOD and TSS (or 65% for equivalent to secondary). The limits in this permit are water-quality-based effluent limits and result in greater than 85% removal.

18. Antibacksliding:

All limits in this permit are at least as stringent as those previously established. Backsliding does not apply to this reissuance.

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19.a. Effluent Limitations/Monitoring Requirements:

Design flow of this facility is 1.5 MGD.

Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE
CBOD ₅ (mg/L)	3,5	10 mg/L	57 kg/day	15 mg/L	85 kg/day	5D/W	24H-C
TSS (mg/L)	2	10 mg/L	57 kg/day	15 mg/L	85 kg/day	5D/W	24H-C
TKN (mg/L)	3,5	5.0 mg/L	62 lb/day	7.5 mg/L	94 lb/day	1/W	24H-C
Ammonia, as N (mg/L)	3,5	2.3 mg/L	2.9 mg/L	NA	NA	5D/W	24H-C
Nitrate+Nitrite, as N (mg/L)	3	NL	NA	NA	NA	1/W	24H-C
Total Nitrogen ^a (mg/L)	3	NL	NA	NA	NA	1/W	Calculated
Total Nitrogen Year-to-Date ^b (mg/L)	3	NL	NA	NA	NA	1/M	Calculated
Total Nitrogen Calendar Year ^b	3, 6	4.0 mg/L	NA	NA	NA	1/YR	Calculated
Total Phosphorus (mg/L)	3	NL	NA	NA	NA	1/W	24H-C
Total Phosphorus Year-to-Date ^b (mg/L)	3	NL	NA	NA	NA	1/M	Calculated
Total Phosphorus Calendar Year ^b	3, 6	0.30 mg/L	NA	NA	NA	1/YR	Calculated
pH (S.U.)	3	NA	NA	6.0 S.U.	9.0 S.U.	1/D	Grab
Dissolved Oxygen (mg/L)	3, 5	NA	NA	6.5 mg/L	NA	1/D	Grab
<i>E. coli</i> (Geometric Mean)	3	126 n/100mls	NA	NA	NA	5D/W	Grab
Total Recoverable Copper ^c	3	18 ug/L	18 ug/L	NA	NA	1/3M	Grab
Total Hardness (mg/L)	3	NL	NL	NA	NA	1/3M	Grab
Bis(2-Ethylhexyl)phthalate (ug/L)	3	NL	NL	NA	NA	1/6M	Grab
Total Recoverable Selenium (ug/L)	3	NL	NL	NA	NA	1/6M	Grab
Chronic Toxicity – <i>C. dubia</i> (TU _c)	NA	NA	NA	NA	NL	1/YR	24H-C
Chronic Toxicity – <i>P. promelas</i> (TU _c)	NA	NA	NA	NA	NL	1/YR	24H-C

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Best Professional Judgment
3. Water Quality Standards
4. VDH-DEQ Disinfection Policy
5. Stream Model- Attachment 11 & 12
6. 9VAC25-40-70.A.4.

MGD = Million gallons per day.*NA* = Not applicable.*NL* = No limit; monitor and report.*S.U.* = Standard units.*TIRE* = Totalizing, indicating and recording equipment.*1/D* = Once every day.*1/W* = Once per week.*5D/W* = Five days a week.*1/M* = Once per month.*1/3M* = Once every three months.*1/6M* = Once every six months.*1/YR* = Once per year.

24H-C = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the monitored 24-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of twenty four (24) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum of twenty four (24) grab samples obtained at hourly or smaller intervals may be collected. Where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by $\geq 10\%$ or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

a. Total Nitrogen = Sum of TKN plus Nitrate+Nitrite

b. See Section 20.a. for more information on the Nutrient Calculations.

c. See Section 20.e for information on the Schedule of Compliance for Total Recoverable Copper.

19.b. Effluent Limitations/Monitoring Requirements:

Stormwater Outfalls 001-003

Effective Dates: During the period beginning with effective date of the permit and lasting until the expiration date.

The facility is authorized to discharge non-contaminated stormwater through Stormwater Outfalls 001-003.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

There shall be no discharge of process wastewater through these outfalls.

20. Other Permit Requirements:

- a. Permit Part I.B. of the permit contains quantification levels and compliance reporting instructions.

9VAC25-31-190.L.4.c. requires an arithmetic mean for measurement averaging and 9VAC25-31-220.D requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Specific analytical methodologies for toxics are listed in this permit section as well as quantification levels (QLs) necessary to demonstrate compliance with applicable permit limitations or for use in future evaluations to determine if the pollutant has reasonable potential to cause or contribute to a violation. Required averaging methodologies are also specified.

The calculations for the Nitrogen and Phosphorus parameters shall be in accordance with the calculations set forth in 9VAC25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia*. §62.1-44.19:13 of the Code of Virginia defines how annual nutrient loads are to be calculated; this is carried forward in 9VAC25-820-70. As annual concentrations (as opposed to loads) are limited in the individual permit, these reporting calculations are intended to reconcile the reporting calculations between the permit programs, as the permittee is collecting a single set of samples for the purpose of ascertaining compliance with two permits.

- b. Permit Part I.C., details the requirements for Whole Effluent Toxicity (WET) Program.

The VPDES Permit Regulation at 9VAC25-31-210 requires monitoring and 9VAC25-31-220.I, requires limitations in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. A WET Program is imposed for municipal facilities with a design rate >1.0 MGD, with an approved pretreatment program or required to develop a pretreatment program, or those determined by the Board based on effluent variability, compliance history, IWC, and receiving stream characteristics.

The facility has completed the necessary toxicity testing (Attachment 13: summary of the toxicity results). Since the effluent passed the decision criteria and performed the quarterly testing following the expansion to 1.5 MGD, the facility will continue with annual monitoring for chronic toxicity in the reissued permit. The facility shall monitor toxicity annually using two test species, *Ceriodaphnia dubia* and *P. promelas*. The statistical evaluations and the WET endpoint spreadsheet are found in Attachment 14.

- c. Permit Part I.D., details the requirements of a Pretreatment Program.

The VPDES Permit Regulation at 9VAC25-31-210 requires monitoring and 9VAC25-31-220.D requires all discharges to protect water quality. The VPDES Permit Regulation at 9VAC25-31-730 through 900., and the Federal Pretreatment Regulation at 40 CFR Part 403 requires POTWs with a design flow of >5.0 MGD and receiving from Industrial Users (IUs) pollutants which pass through or interfere with the operation of the POTW or are otherwise subject to pretreatment standards to develop a pretreatment program.

The facility will be required to perform the Industrial Users Survey with this reissuance. If any Significant Industrial Users or Categorical Industries are identified, the facility will need to establish a pretreatment program upon notification from DEQ. The requirements for a pretreatment program are included in this section of the permit.

- d. Permit Part I.E., details the requirements of the Schedule of Compliance for Total Recoverable Copper

The VPDES Permit Regulation, 9VAC25-31-250 allows use of Compliance Schedules to allow facilities sufficient time for upgrades to meet newly established effluent limits. The permit contains newly established limits for Total Recoverable Copper. Since the facility was not designed to meet these limits, a schedule of compliance is required to provide the permittee time for facility upgrade. The permittee shall achieve compliance with the final limits specified in Part I.A. of the VPDES permit in accordance with the following schedule as contained in Part I.E. of the permit:

Action	Time Frame
1. Select engineering firm for design of facilities or submit proposed plan to achieve compliance with final limits.	Within 180 days after the effective date of the permit.
2. Report of progress on attainment of final limits.	The first annual report is twelve months after the effective date.
3. Achieve compliance with final limits.	Within 4 years from the effective date of the permit.

21. Other Special Conditions:

- a. **95% Capacity Reopener.** The VPDES Permit Regulation at 9VAC25-31-200.B.4 requires all POTWs and PVOTWs develop and submit a plan of action to DEQ when the monthly average influent flow to their sewage treatment plant reaches 95% or more of the design capacity authorized in the permit for each month of any three consecutive month period. This facility is a POTW.
- b. **Indirect Dischargers.** Required by VPDES Permit Regulation, 9VAC25-31-200 B.1 and B.2 for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.
- c. **O&M Manual Requirement.** Required by Code of Virginia §62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790; VPDES Permit Regulation, 9VAC25-31-190.E. The permittee shall maintain a current Operations and Maintenance (O&M) Manual. The permittee shall operate the treatment works in accordance with the O&M Manual and shall make the O&M Manual available to Department personnel for review upon request. Any changes in the practices and procedures followed by the permittee shall be documented in the O&M Manual within 90 days of the effective date of the changes. Non-compliance with the O&M Manual shall be deemed a violation of the permit.
- d. **CTC, CTO Requirement.** The Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790 requires that all treatment works treating wastewater obtain a Certificate to Construct prior to commencing construction and to obtain a Certificate to Operate prior to commencing operation of the treatment works.
- e. **Water Quality Criteria Reopener.** The VPDES Permit Regulation at 9VAC25-31-220 D. requires establishment of effluent limitations to ensure attainment/maintenance of receiving stream water quality criteria. Should effluent monitoring indicate the need for any water quality-based limitations, this permit may be modified or alternatively revoked and reissued to incorporate appropriate limitations.
- f. **Licensed Operator Requirement.** The Code of Virginia at §54.1-2300 et seq. and the VPDES Permit Regulation at 9VAC25-31-200 C, and by the Board for Waterworks and Wastewater Works Operators and Onsite Sewage System Professionals Regulations (18VAC160-20-10 et seq.) requires licensure of operators. This facility requires a Class I operator.
- g. **Reliability Class.** The Sewage Collection and Treatment Regulations at 9VAC25-790 require sewage treatment works to achieve a certain level of reliability in order to protect water quality and public health consequences in the event of component or system failure. Reliability means a measure of the ability of the treatment works to perform its designated function without failure or interruption of service. The facility is required to meet a reliability Class of I.
- h. **E3/E4.** VAC25-40-70 B authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.
- i. **Nutrient Reopener.** 9VAC25-40-70 A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade. 9VAC25-31-390 A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.
- j. **TMDL Reopener.** This special condition is to allow the permit to reopened if necessary to bring it in compliance with any applicable TMDL that may be developed and approved for the receiving stream.

- k. **PCB Pollutant Minimization Plan.** This special condition requires the permittee, upon notification from DEQ-NRO, to submit a Pollutant Minimization Plan (PMP) to identify known and unknown sources of low-level PCBs in the effluent. This special condition details the contents of the PMP and also requires an annual report on progress to identify sources.

22. Permit Section Part II.

Required by VPDES Regulation 9VAC25-31-190, Part II of the permit contains standard conditions that appear in all VPDES Permits. In general, these standard conditions address the responsibilities of the permittee, reporting requirements, testing procedures and records retention.

23. Permit Section Part III.

Part III of the permit contains conditions and requirements for monitoring and distribution of biosolids. The VPDES Permit Regulation 9VAC25-31-420 through 729 establishes the standards for the use or disposal of biosolids; specifically land application and surface disposal, promulgated under 40 CFR Part 503. Standards consist of general requirements, pollutant limits, management practices and operational standards. Furthermore, VPA Regulation 9VAC25-32-303 through 685 sets forth the requirements pertaining to Class B biosolids. The permit sets forth the parameters to be monitored, monitoring frequencies, sampling types, the Biosolids Reopener Special Condition, the Biosolids Use and Disposal Special Condition, and the Biosolids Management Plan and reporting requirements.

24. Changes to the Permit from the Previously Issued Permit:

- a. Special Conditions:
- 1) The PCB Monitoring Special Condition was removed since the facility has completed the required testing. In lieu of further monitoring, a PCB Pollutant Minimization Plan Special Condition was included.
 - 2) The Monitoring Frequency and Sample Type Special Condition was removed since it was applicable at the 1.0 MGD flow tier.
 - 3) The Treatment Works Closure Plan Special Condition was removed.
 - 4) The Sludge Use and Disposal and Sludge Reopener Special Conditions were moved to Part III of the permit with the other monitoring requirements and special conditions relating to sewage sludge/biosolids.
 - 5) The Whole Effluent Toxicity language was updated since the 1.0 MGD tier was removed and the facility has completed the quarterly monitoring at the 1.5 MGD tier.
 - 6) A Compliance Schedule for meeting the Total Recoverable Copper limitation was included.
- b. Monitoring and Effluent Limitations:
- 1) The 1.0 MGD flow tier and associated limits has been removed since the facility has expanded to 1.5 MGD.
 - 2) A limitation for Total Recoverable Copper was included.
 - 3) Monitoring for Total Hardness, Total Recoverable Selenium, and Bis(2-Ethylhexyl)phthalate were included.
- c. Other:
- 1) The river mile was updated from 1.48 to 1.27 based on DEQ-Planning Department's review of the facility location using GIS. The stream code was also updated from XAA to 1a-XAA.

25. Variances/Alternate Limits or Conditions:

There are no variances or alternate limits.

26. Public Notice Information:

First Public Notice Date: 4/8/15

Second Public Notice Date: 4/15/15

Public Notice Information is required by 9VAC25-31-280 B. All pertinent information is on file and may be inspected, and copied by contacting the: DEQ Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193, Telephone No. (703) 583-3834, alison.thompson@deq.virginia.gov. See Attachment 15 for a copy of the public notice document.

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer and of all persons represented by the commenter/requester, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for

public hearings shall state 1) the reason why a hearing is requested; 2) a brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and 3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given. The public may request an electronic copy of the draft permit and fact sheet or review the draft permit and application at the DEQ Northern Regional Office by appointment.

27. Additional Comments:

Previous Board Action(s): None.

Staff Comments: None.

Public Comment: No public comments were received during the public notice.

Attachment 1

December 30, 2014

MEMORANDUM

TO: VPDES Reissuance File VA0022802

FROM: Alison Thompson

SUBJECT: Flow Frequency Determination for VPDES Permit No. VA0022802
Basham Simms Wastewater Treatment Facility

This flow frequency analysis is necessary for the VPDES permit reissuance for the Basham Simms WWTF. The Flow Frequency determination was last done in 1999. The stream statistics for the reference gage were updated in 2006, so staff believes it is appropriate to review the values used to establish the wasteload allocations.

Staff reviewed the January 22, 1999 memorandum. Originally an analysis was done to determine the critical flow values using flow data from the gage at North Fork Goose Creek at Route 722 (#01643800) and the gage at Catoctin Creek at Taylorstown (#01638480). The gage at North Fork Goose Creek at Route 722 (#01643800) has not been maintained, so there is no current flow data from this gage; it is staff's best professional judgment that the flows are no longer appropriate to use. The other gage station used in the original analysis, Catoctin Creek at Taylorstown (#01638480), is still maintained and has up-to-date flow information. Since only one of the gage stations has current flow information, the flow frequencies at the outfall location shall be determined using values at the Catoctin Creek at Taylorstown (#01638480), and adjusting them by proportional drainage areas.

Catoctin Creek at Taylorstown (#01638480)
(Gaging station data 1971-present)

Drainage area	=	89.6 sq. mi.
1Q10	=	0.52 cfs
7Q10	=	0.63 cfs
30Q5	=	2.8 cfs
30Q10	=	1.5 cfs
1Q30	=	0.17 cfs
High flow 30Q10	=	12 cfs
High flow 1Q10	=	4.9 cfs
High flow 7Q10	=	7.0 cfs
HM	=	11 cfs

North Fork Goose Creek, UT at the Basham Simms WWTF discharge point

Drainage area	=	0.81 sq. mi.	
1Q10	=	0.005 cfs	0.003 MGD
7Q10	=	0.0057 cfs	0.0036 MGD
30Q5	=	0.025 cfs	0.016 MGD
30Q10	=	0.0136 cfs	0.0088 MGD
1Q30	=	0.0015 cfs	0.0010 MGD
High flow 30Q10	=	0.108 cfs	0.070 MGD
High flow 1Q10	=	0.044 cfs	0.028 MGD
High flow 7Q10	=	0.063 cfs	0.041 MGD
HM	=	0.099 cfs	0.064 MGD

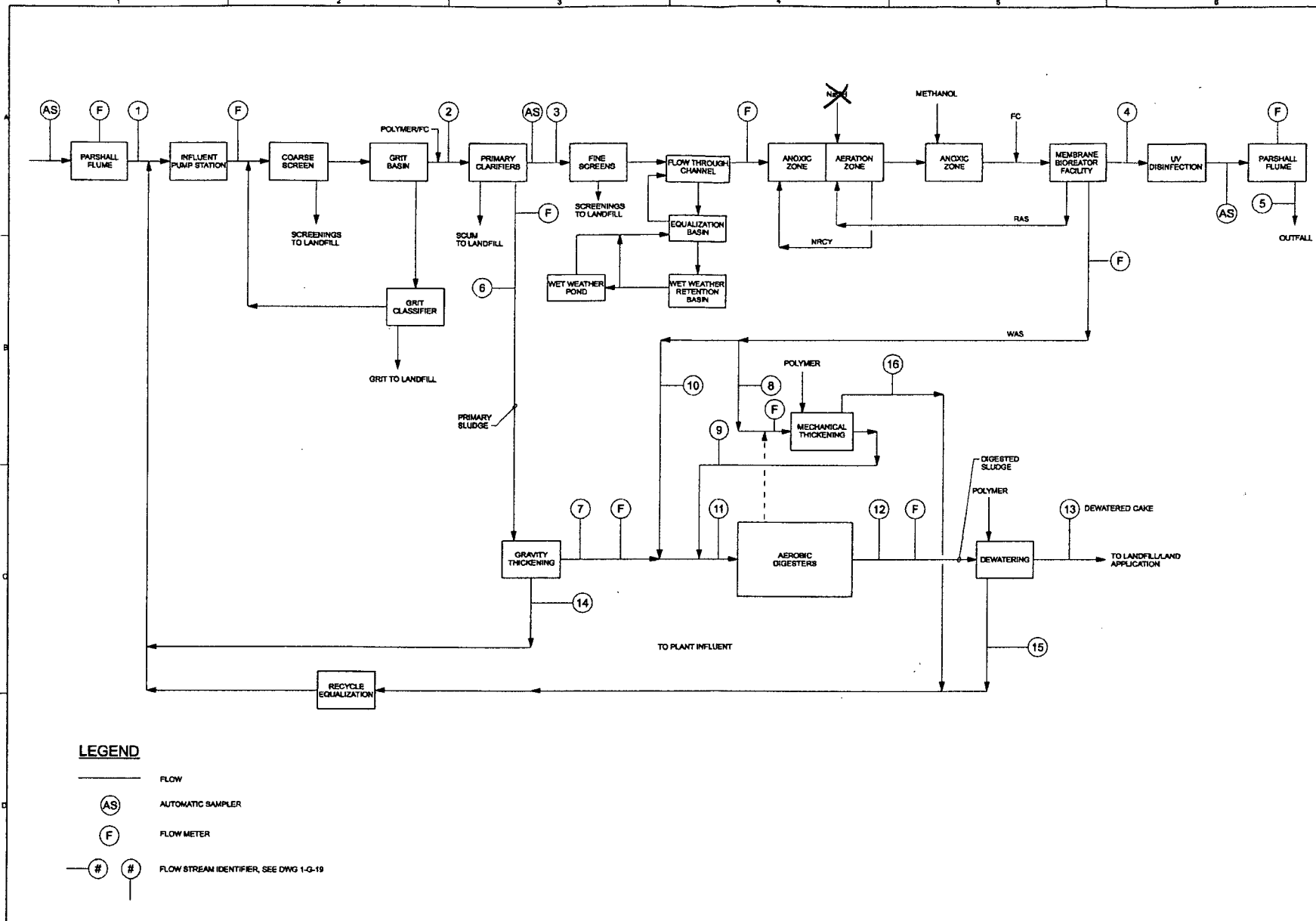
The high flow months are December – May.

Historically, the low flows for 1Q10, 7Q10, and 30Q10 have been zero. This is based on the small drainage area of the unnamed tributary receiving the discharge as well as staff observations during site and stream inspections. It is

staff's best professional judgment that these assumptions are still accurate; therefore, for the purposes of establishing the wasteload allocations at low flows, the critical flows for 1Q10, 7Q10, and 30Q10 shall continue to be zero. Since the 1Q10 and 7Q10 are zero, the harmonic mean shall also be zero for the wasteload allocation analyses.

Attachment 2

ATTACHMENT B



LEGEND

- FLOW
- (AS) AUTOMATIC SAMPLER
- (F) FLOW METER
- # # FLOW STREAM IDENTIFIER, SEE DWG 1-G-19



NO.	DATE	BY	CHK	REV
1	10/20/2007	J. COOPER	J. COOPER	1
2	10/20/2007	J. COOPER	J. COOPER	2
3	10/20/2007	J. COOPER	J. COOPER	3
4	10/20/2007	J. COOPER	J. COOPER	4
5	10/20/2007	J. COOPER	J. COOPER	5

1800 CONFERENCE CENTER DRIVE
SUITE 200, CHANTILLY, VA 20151
703.378.5000

CH2MHILL
Dewberry

GENERAL
PROCESS FLOW SCHEMATIC
OVERVIEW

VERIFY SCALE
BAR IS ONE INCH ON PROJECT DRAWING
DATE OCTOBER 2007
PROJ 332434.DS
DWG 1-G-16
SHEET 16



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

NORTHERN REGIONAL OFFICE

13901 Crown Court, Woodbridge, Virginia 22193

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www.deq.virginia.gov

Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

Thomas A. Faha
Regional Director

June 18, 2014

Via E-mail (avanegas@purcellvilleva.gov)

Mr. Alex Vanegas
Director of Public Works
Town of Purcellville
221 S. Nursery Avenue
Purcellville, VA 20132

Re: Termination of Virginia Pollutant Discharge Elimination System (VPDES) General Permit for Storm Water Discharges Associated with Industrial Activity – VAR051442

Dear Mr. Vanegas:

Based on a site review conducted May 27, 2014, the Department of Environmental Quality - Northern Regional Office has approved a no-exposure certification request received on June 3, 2014, for the Basham Simms Wastewater Facility. Pursuant to 9VAC25-151-50 C, an owner covered by the VPDES General Permit for Storm Water Discharges Associated with Industrial Activity who is later able to file a no-exposure certification to be excluded from permitting is no longer authorized by nor required to comply with this permit. Additionally, if the owner is no longer required to have permit coverage due to a no-exposure exclusion, the owner is not required to submit a notice of termination. As such, the Department of Environmental Quality has approved the termination of the Permit referenced above. Termination of this permit does not prohibit the discharge of storm water from the Basham Simms Wastewater Facility; rather, it reflects that there is no storm water discharge associated with industrial activity that is currently subject to permitting. Additionally, termination of this permit does not change or alter terms and conditions of the facility's individual permit, nor does this termination relieve the facility from complying with the individual permit (VA0022802). Your general permit will be allowed to expire at the end of its term on June 30, 2014. You are not required to re-apply for coverage under the 2014 – 2019 VPDES General Permit for Storm Water Discharges Associated with Industrial Activity. As such, your registration fee will be refunded. Correspondence pertaining to this refund will be provided under separate correspondence.

Please note that should a discharge arise in accordance with 9VAC25-31-100, Application for a Permit, Basham Simms Wastewater Facility shall be responsible for complying with Virginia State Water Control Laws and Regulations. Additionally, coverage may be necessary at a later date should changes to regulations be implemented or site activities change.

Should you have any questions or need any additional information, please contact Susan Mackert at (703) 583-3853 or by email at susan.mackert@deq.virginia.gov.

Sincerely,



Bryant Thomas
Water Permits and Planning Manager

Enc: Site memorandum

cc: File – VAR051442
Lisa Janovsky – DEQ Compliance Inspector
Becky Vice – DEQ Compliance Auditor
Scott House – shouse@purcellvilleva.gov

MEMORANDUM
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
NORTHERN REGIONAL OFFICE

13901 Crown Court

Woodbridge, VA 22193

SUBJECT: Basham Simms Wastewater Facility (VAR051442)

TO: File

FROM: Susan Mackert

DATE: June 13, 2014

COPIES: Mr. Scott House – Superintendent

A site visit was performed on May 27, 2014, to assess drainage patterns, point source discharge locations, and permit applicability for the referenced facility. Additionally, the site visit verified information provided in a no-exposure certification request received June 3, 2014.

General Site Observations

- The facility operates under SIC Code 4952 (wastewater treatment) which falls under Sector T – Treatment Works of the Virginia Pollutant Discharge Elimination System (VPDES) General Permit for Storm Water Discharges Associated with Industrial Activity (SWGP).
- The facility is an advanced wastewater treatment plant with a design flow of 1.5 Million Gallons per Day (MGD).
- The facility comprises approximately 13 acres with paved and grass surfaces and consists of office buildings and typical wastewater treatment process units.
- A road and vehicle maintenance facility for the Town of Purcellville is also located on the property associated with the wastewater treatment plant. This area has two primary components: a salt/gravel/sand storage area and a maintenance shop with wash bay.
 - The salt/gravel/sand storage area is covered and located within a containment berm (photo 1). Storm water collected within the containment berm is directed to the headworks of the wastewater treatment plant.
 - All floor drains within the covered vehicle maintenance facility, as well as those within the wash bay, are directed to the headworks of the wastewater treatment plant (photos 2 – 4).
- The facility has three storm water outfalls, only one of which is regulated under the SWGP.
 - Storm water Outfall 001 is located on the north side of the facility (photo 5). The drainage area consists of paved and grassy areas adjacent to the solids handling and sludge bay areas as well as the main office/laboratory building (photos 6 - 8). Storm water leaving Outfall 001 travels several hundred feet by sheet flow before entering an unnamed tributary to North Fork Goose Creek.
 - Storm water flow from paved and grassy areas adjacent to the aeration basins and membrane building area travels by sheet flow with discharge to an unnamed tributary to North Fork Goose Creek (photo 9). Sheet flow discharges such as this are currently exempt from coverage under the general industrial storm water permit.
 - Drop inlets located in the exterior paved areas adjacent to the vehicle maintenance facility direct storm water to a retention pond near the main gate (photo 10). This pond does discharge under during heavy rain events. Since the discharge is considered similar to that of Outfall 001 described above, visuals were conducted at Outfall 001.

- Areas of potential storm water contamination include the solids handling area and sludge bay. Both areas are undercover with storm water returned to the headworks. As such, there is no reasonable potential for these areas to impact storm water quality.

Staff Recommendations

The requirements found within 9VAC25-151 are applicable to point source storm water discharges associated with industrial activity. Based on observations made during the site visit, it is staff's best professional judgement that there is no reasonable potential for the industrial activity at the Basham Simms Wastewater Facility to impact storm water quality. Storm water discharges are comprised primarily of runoff from paved and grassy areas. Discharges such as this are currently exempt from coverage under the general industrial storm water permit. Any areas of potential storm water contamination are returned to the headworks thereby not impacting storm water quality.

The facility maintains coverage under the VPDES General Permit for Storm Water Discharges Associated with Industrial Activity (VAR051442). Pursuant to 9VAC25-151-50 C, an owner covered by the VPDES General Permit for Storm Water Discharges Associated with Industrial Activity who is later able to file a no-exposure certification to be excluded from permitting is no longer authorized by nor required to comply with this permit. Additionally, if the owner is no longer required to have permit coverage due to a no-exposure exclusion, the owner is not required to submit a notice of termination. Please note that if a discharge arises in accordance with 9VAC25-31-100, Application for a Permit, the Basham Simms Wastewater Facility shall be responsible for complying with Virginia State Water Control Law and Regulations. Additionally, coverage may be necessary at a later date should changes to regulations be implemented or site activities change.



Photo 1. Salt/gravel/sand storage area.



Photo 2. Covered vehicle maintenance facility.



Photo 3. Covered vehicle maintenance facility. Floor drains are directed to the headworks of the wastewater treatment plant.



Photo 4. Wash bay located within maintenance facility. Floor drains are directed to the headworks of the wastewater treatment plant.



Photo 5. Storm water Outfall 001.

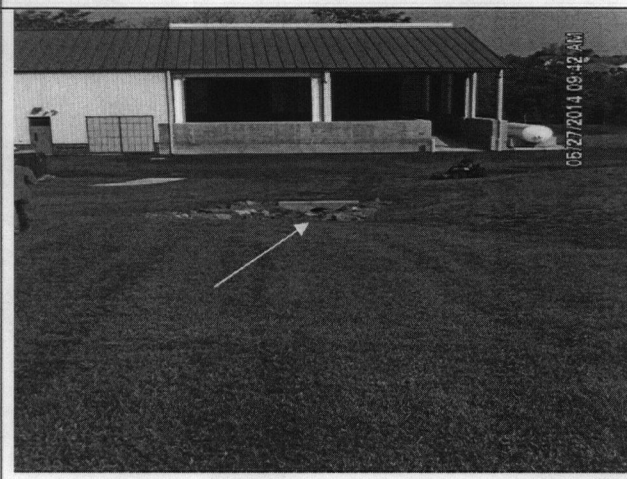


Photo 6. Drainage area to Outfall 001. Storm water flow enters the culvert (noted by the arrow) and travels underground until discharge. The sludge bay is in the background.



Photo 7. Drainage area to Outfall 001.

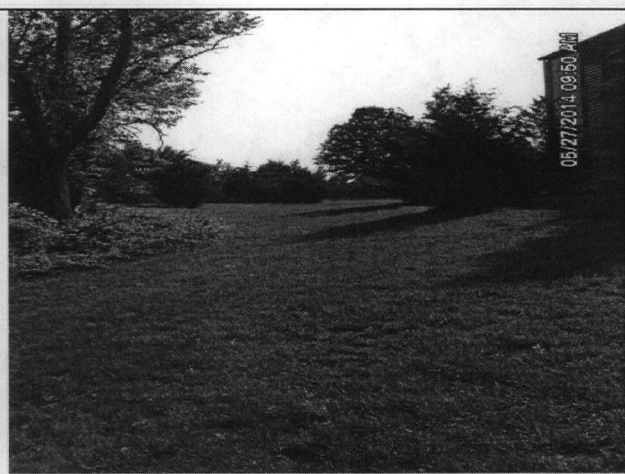


Photo 8. Drainage area to Outfall 001.

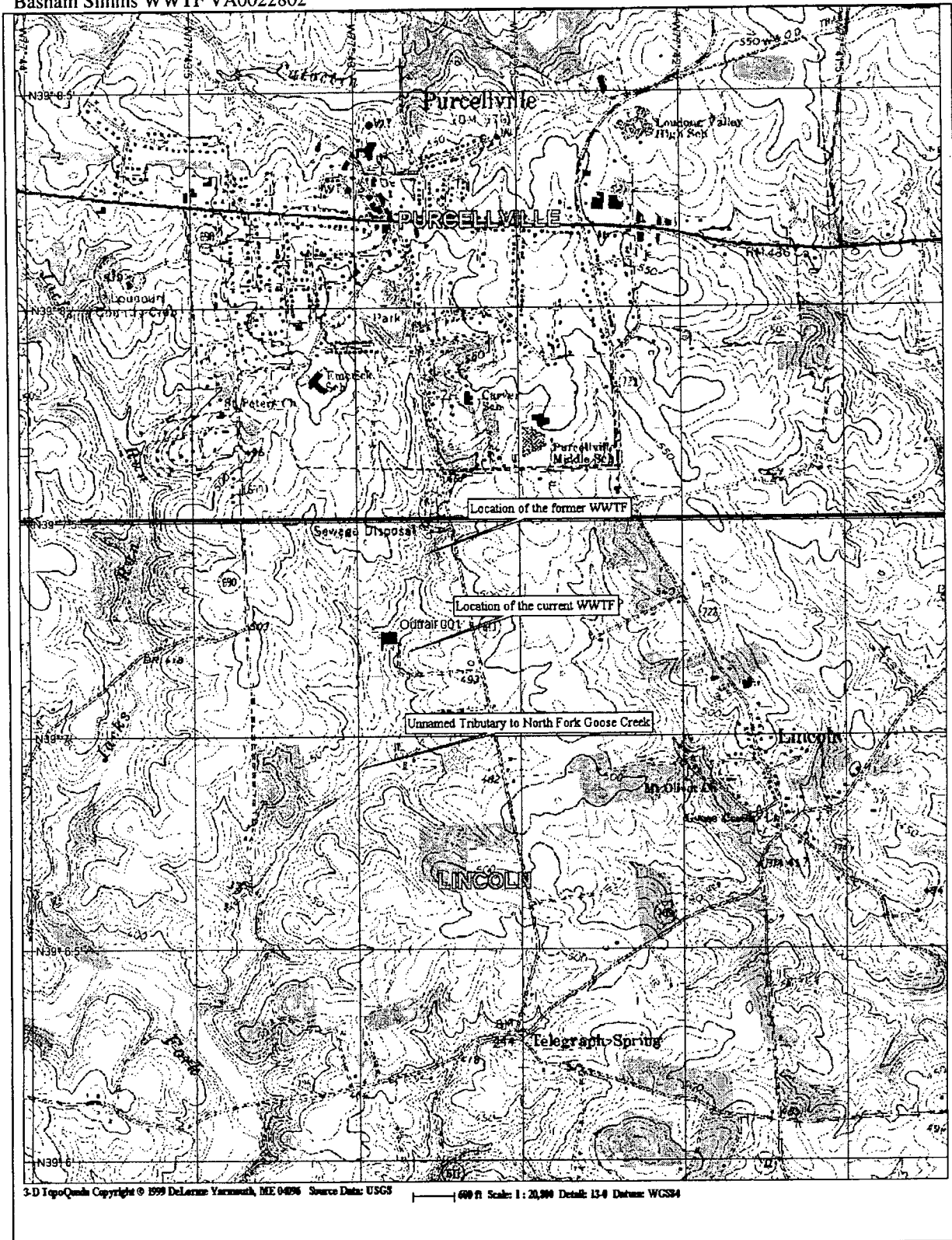


Photo 9. Sheet flow location for storm water from the aeration basins and membrane building. Flow is in the direction of the arrow.



Photo 10. Storm water retention pond at main gate.

Attachment 3



Attachment 4



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

NORTHERN REGIONAL OFFICE

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Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

Thomas A. Faha
Regional Director

September 30, 2014

Ms. Samer Beidas
Director of Public Works
Town of Purcellville
130 E. Main Street
Purcellville, VA 20132

Re: Basham Simms WWTF; Permit # VA0022802

Dear Mr. Beidas:

Attached is a copy of the Inspection Report generated from the Facility Technical and Laboratory Inspection conducted at Basham Simms - Wastewater Treatment Facility (WWTF) on September 10, 2014. The compliance staff would like to thank Mr. Scott House for his assistance during this inspection. This letter is not intended as a case decision under the Virginia Administrative Process Act, Va. Code § 2.2-4000 *et seq.* (APA).

If you have any questions or comments concerning this report, please feel free to contact me at the Northern Regional Office at (703) 583-3801 or by email at lisa.janovsky@deq.virginia.gov.

Sincerely,

A handwritten signature in cursive script, reading "Lisa Janovsky".

Lisa Janovsky
Environmental Specialist II

Electronic copy sent:

Permits / DMR File, Compliance Manager, Compliance Auditor – DEQ

FOCUSED CEI TECH/LAB INSPECTION REPORT

Permit #	VA0022802
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PREFACE

VPDES/State Certification No.	(RE) Issuance Date	Amendment Date	Expiration Date
VA0022802	February 19, 2010		February 18, 2015
Facility Name	Address		Telephone Number
Basham Simms Wastewater Facility	1001 South 20th Street Purcellville, VA		540-338-4945
Owner Name	Address		Telephone Number
Town of Purcellville	130 E. Main Street Purcellville, VA		540-338-7421
Responsible Official	Title		Telephone Number
Samer Beidas	Director of Public Works		540-751-2314
Responsible Operator	Operator Cert. Class/number		Telephone Number
Scott House	Class I / 1965006365		540-338-4945

TYPE OF FACILITY:

DOMESTIC				INDUSTRIAL			
Federal		Major	X	Major		Primary	
Non-federal	X	Minor		Minor		Secondary	

INFLUENT CHARACTERISTICS:

DESIGN:

	Flow	1.5 MGD	
	Population Served	7,727	
	Connections Served	2,586	

EFFLUENT LIMITS: Outfall 001

Parameter	Min.	Avg.	Max.	Parameter	Min.	Avg.	Max.
Flow (MGD)	NA	NL	NA	pH (S.U.)	6.0	NA	9.0
CBOD₅ (mg/L)		10	15	TSS (mg/L)		10	15
D.O. (mg/L)	6.5			Ammonia as N (mg/L)		2.3	2.9
TKN (mg/L)		5.0	7.5	TN (Calendar Year) mg/L		4.0	
TP (Calendar Year) mg/L		0.30		E. Coli (n/100 mLs)	126n/100		

	Receiving Stream	UT, N. Fork Goose Creek	
	Basin	Potomac River	
	Discharge Point (LAT)	39°07'09"	
	Discharge Point (LONG)	77°42'57"	

FOCUSED CEI TECH/LAB INSPECTION REPORT

Permit #	VA0022802
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Virginia Department of Environmental Quality

FACILITY NAME: Basham Simms WWTF		INSPECTION DATE: September 10, 2014					
PERMIT No.: VA0022802		INSPECTOR: Lisa Janovsky					
TYPE OF FACILITY:		REPORT DATE: September 30, 2014					
<input checked="" type="checkbox"/> Municipal <input type="checkbox"/> Industrial <input type="checkbox"/> Federal <input type="checkbox"/> HP <input type="checkbox"/> LP	<input checked="" type="checkbox"/> Major <input type="checkbox"/> Minor <input type="checkbox"/> Small Minor	TIME OF INSPECTION: <table style="width: 100%; border: none;"> <tr> <td style="border: none; width: 50%;">Arrival</td> <td style="border: none; width: 50%;">Departure</td> </tr> <tr> <td style="border: none; text-align: center;">10:00am</td> <td style="border: none; text-align: center;">12:30pm</td> </tr> </table>	Arrival	Departure	10:00am	12:30pm	TOTAL TIME SPENT 20 hours
Arrival	Departure						
10:00am	12:30pm						
PHOTOGRAPHS: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		UNANNOUNCED INSPECTION? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No					
REVIEWED BY / Date: <div style="text-align: center; margin-top: 10px;"> 9/28/14 </div>							
PRESENT DURING INSPECTION: Sharon Allen - DEQ Scott House - Basham Simms Class I Operator							

TECHNICAL INSPECTION Permit VA0022802

1. Has there been any new construction? • If so, were plans and specifications approved? <u>Comments:</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Is the Operations and Maintenance Manual approved and up-to-date? <u>Comments:</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
3. Are the Permit and/or Operation and Maintenance Manual specified licensed operator being met? <u>Comments:</u> 7 operators: Class I (4), Class II (2), Class III (1)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
4. Are the Permit and/or Operation and Maintenance Manual specified operator staffing requirements being met? <u>Comments:</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
5. Is there an established and adequate program for training personnel? <u>Comments:</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
6. Are preventive maintenance task schedules being met? <u>Comments:</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
7. Does the plant experience any organic or hydraulic overloading? <u>Comments:</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
8. Have there been any bypassing or overflows since the last inspection? <u>Comments:</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
9. Is the standby generator (including power transfer switch) operational and exercised regularly? <u>Comments:</u> Two generators onsite, tested once per week. Once per year, Cummins Power Systems, LLC provides full preventative maintenance and training on the generator	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
10. Is the plant alarm system operational and tested regularly? <u>Comments:</u> Weekly	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
11. Is sludge disposed of in accordance with the approved sludge management plan? <u>Comments:</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

FOCUSED CEI TECH/LAB INSPECTION REPORT

Permit #

VA0022802

<p>12. Is septage received?</p> <ul style="list-style-type: none"> • If so, is septage loading controlled, and are appropriate records maintained? <p><u>Comments:</u></p>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<p>13. Are all plant records (operational logs, equipment maintenance, industrial waste contributors, sampling and testing) available for review and are records adequate?</p> <p><u>Comments:</u></p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<p>14. Which of the following records does the plant maintain?</p> <div style="display: flex; justify-content: space-between;"> <input checked="" type="checkbox"/> Operational logs <input checked="" type="checkbox"/> Instrument maintenance & calibration </div> <div style="display: flex; justify-content: space-between;"> <input checked="" type="checkbox"/> Mechanical equipment maintenance <input type="checkbox"/> Industrial Waste Contribution (Municipal facilities) </div> <p><u>Comments:</u></p>	
<p>15. What does the operational log contain?</p> <div style="display: flex; justify-content: space-between;"> <input checked="" type="checkbox"/> Visual observations <input checked="" type="checkbox"/> Flow Measurement <input checked="" type="checkbox"/> Laboratory results <input checked="" type="checkbox"/> Process adjustments </div> <div style="display: flex; justify-content: space-between;"> <input checked="" type="checkbox"/> Control calculations <input type="checkbox"/> Other (specify) _____ </div> <p><u>Comments:</u></p>	
<p>16. What do the mechanical equipment records contain?</p> <div style="display: flex; justify-content: space-between;"> <input checked="" type="checkbox"/> As built plans and specs <input checked="" type="checkbox"/> Manufacturers instructions <input checked="" type="checkbox"/> Lubrication schedules </div> <div style="display: flex; justify-content: space-between;"> <input checked="" type="checkbox"/> Spare parts inventory <input checked="" type="checkbox"/> Equipment/parts suppliers </div> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Other (specify) _____ </div> <p><u>Comments:</u></p>	
<p>17. What do the industrial waste contribution records contain (Municipal only)?</p> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Waste characteristics <input type="checkbox"/> Impact on plant <input type="checkbox"/> Locations and discharge types </div> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Other (specify) _____ </div> <p><u>Comments:</u> N/A</p>	
<p>18. Which of the following records are kept at the plant and available to personnel?</p> <div style="display: flex; justify-content: space-between;"> <input checked="" type="checkbox"/> Equipment maintenance records <input checked="" type="checkbox"/> Operational log <input checked="" type="checkbox"/> Industrial contributor records </div> <div style="display: flex; justify-content: space-between;"> <input checked="" type="checkbox"/> Instrumentation records <input checked="" type="checkbox"/> Sampling and testing records </div> <p><u>Comments:</u></p>	
<p>19. List records not normally available to plant personnel and their location:</p> <p><u>Comments:</u> N/A</p>	
<p>20. Are the records maintained for the required time period (three or five years)?</p> <p><u>Comments:</u></p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

VA DEQ Focused CEI Tech/Lab Inspection Report

Permit #

VA0022802

UNIT PROCESS EVALUATION SUMMARY SHEET

UNIT PROCESS	APPLICABLE	PROBLEMS*	COMMENTS
Sewage Pumping	Y	N	6 total pumps, only 1-2 pumps in service at a time. New 20HP 90 GPM pump purchased.
Flow Measurement (Influent)	Y	N	Current flow measured: 0.544 MGD. Flow meter calibrated on 3/4/14 by S-L Controls.
Screening/Comminution Coarse Screening	Y	N	Two manual bar screens for use in high flow and/or maintenance problems and one automatic raptor drum screen for typical use.
Grit Removal	Y	N	Grit classifier is automatic. Removes 30 gallons of grit per day, which is limed and placed in a dumpster for landfill disposal. Ferric chloride is no longer added to the grit channel-not needed as a P-removal aid at this time.
Flow Equalization	Y	N	There is an EQ basin, wet weather basin, and a wet weather pond for high flow management.
Primary Sedimentation	Y	N	Two primary clarifiers, one in service. Clarifiers rotated once/year so they do not wear out. Sludge is pumped to the gravity thickener.
Screening /Comminution Fine Screens	Y	N	There are three fine screens, but only one in service. If there is a heavy rain, they may put two online.
Biological Nutrient Removal	Y	N	Modified 4-stage Bardenpho process. 2.5-2.7 MGD RAS is added at the end of the first aeration zone. Additionally, 50 GPD of Ferric is added and 32 GPD of methanol is added for nutrient removal. Mixers are pulled and hosed off once/week. D.O. is automatically controlled and adjusted by SCADA. Current D.O.=2.83mg/L,
Filtration	Y	N	Membrane bioreactors - Four trains, three cassettes in each train. Two cassettes are cleaned with sodium hypochlorite every other week (cassette number one and four will be cleaned the first week, two and three the second week, and so forth). The cassettes are cleaned once/month with citric acid. A recovery clean is performed two times per year with both citric acid and sodium hypochlorite. There are three blowers and two compressors for the system.
Ultraviolet Disinfection	Y	N	Trojan 3000. Three banks available but only one is in use. All bulbs go through a major clean once/year.
Post Aeration	Y	N	Step aeration prior to outfall 001.
Flow Measurement (Effluent)	Y	N	Hydroranger XPS 10 calibrated by S-L Controls 3/4/14
Plant Outfall	Y	N	Enters North Fork Goose Creek, UT
Gravity Thickening	Y	N	Receives WAS from primary clarifier and anoxic tank. Operators check the blanket level daily. The operators hose it down once per day. Thickened sludge goes to the digesters and any overflow goes back to the head of the plant.
Aerobic Digestion	Y	N	Sludge from the digesters goes into two "day tanks", each with the holding capacity of 15,000

VA DEQ Focused CEI Tech/Lab Inspection Report

			<i>gallons. These tanks are cleaned once/year. Sludge from the day tanks goes into the belt press. At this stage, 50% volatile reduction is achieved.</i>
Centrifugation	Y	N	<i>Centrifuge is run about once per week. They achieve 4-6% solids</i>
Sludge Press	Y	N	<i>The belt press is run two times per week on Mondays and Wednesdays. The solids concentration is about 22% (belt press is designed for 18%).</i>
Land Application (sludge)	Y	N	<i>The sludge off the belt press gets stored in a biosolids storage room, where it is dried further. 50 wet tons per month are picked up by Synagro for land application.</i>

* Problem Codes

1. Unit Needs Attention
2. Abnormal Influent/Effluent
3. Evidence of Equipment Failure
4. Unapproved Modification/Temporary Repair
5. Evidence of Process Upset
6. Other (explain in comments)

VA DEQ Focused CEI Tech/Lab Inspection Report

Permit #

VA0022802

INSPECTION OVERVIEW AND CONDITION OF TREATMENT UNITS

- Arrived onsite at 10:00am with Sharon Allen. Met with Scott House, the class I operator on duty. Mr. House stated that there are 7 total operators and the hours of operation are 7 days a week, 12 hour shifts on weekdays and 10 hour shifts on weekends.
- Mr. House informed us that the signal to the pump had went down on anoxic tank #2 that morning and they were attempting to find a spare part to fix it. In the meantime, the pump was placed on manual mode for approximately 6 hours.
Update via email 9/10/14 from Scott House. The transmittance was fixed with a spare part found onsite.
- Mr. House took DEQ around the facility beginning at the headworks. Approximately 30 gallons of grit and screenings are placed in the dumpster per day, after they are limed. Once per week, the dumpsters are emptied and taken to the landfill.
- After the screening area, DEQ walked over to the primary sedimentation, fine screens, and EQ basins. Some algae was seen on the clarifier, but no other problems observed.
- DEQ then walked over to the BNR tanks. It appeared that older foam was building up in the corners, where the water was not moving as fast. Mr. House stated that process non-potable water is used to help push the flow through the basins. The slow areas are hosed approximately once per week to assist in water movement. Mr. House stated that they add ferric and methanol to the tanks, which is flow-based. This chemical addition keeps the phosphorus under 0.2 mg/L and Total Nitrogen under 4 mg/L respectively. The methanol feed lines are heat traced and the system is maintained once per year and checked for safety by Eagle Fire. Mr. House stated that they are looking into possibly using Micro-C instead of methanol for phosphorus removal. The effluent in the BNR tanks had an orange tint to it due to ferric addition and the basins appeared stained (photos 3 and 4).
- DEQ then walked over to the membrane bioreactors. All of the hoses were changed out at the last recovery clean. No problems observed in this area.
- Mr. House showed us several rooms where spare parts storage took place. It was very organized and good housekeeping was displayed. The parts are organized on shelves and labeled.
- There are two generators onsite. If one generator fails, then the plant can still operate. Cummins Power Systems, LLC comes onsite once per year and performs a full preventative maintenance and training for staff on generator use.
- The UV disinfection is under cover. The bulbs are replaced every two years or when they reach 14,000 hours. They were last replaced on 4/25/14. There are intensity meters onsite, but they are not currently utilized. E.coli sampling is performed five days/week. The bulbs undergo a major clean two times per year. Used UV bulbs that are still in working order are kept onsite as a back-up method.
- There were no problems observed with the solids handling area. Spare parts were available and housekeeping was very satisfactory in this area as well. The belt on the belt press is cleaned with simple green once per month.
- Preventative maintenance tags are seen throughout the facility with updated dates and employee initials on each item (pumps, generator etc...). Additionally, process sheets are created where tasks are assigned and initialed by the employee that completed the task. The last calibration date for the thermometers at the influent and effluent was 11/11/2013.

VA DEQ Focused CEI Tech/Lab Inspection Report

LABORATORY INSPECTION

PRESENT DURING INSPECTION:

Sharon Allen-DEQ

Scott House-Class 1 Operator on Duty

1. Do lab records include sampling date/time, analysis date/time, sample location, test method, test results, analyst's initials, instrument calibration and maintenance, and Certificate of Analysis? <input checked="" type="checkbox"/> Sampling Date/Time <input type="checkbox"/> Analysis Date/Time <input checked="" type="checkbox"/> Sample Location <input checked="" type="checkbox"/> Test Method <input checked="" type="checkbox"/> Test Results <input checked="" type="checkbox"/> Analyst's Initials <input checked="" type="checkbox"/> Instrument Calibration & Maintenance <input checked="" type="checkbox"/> Chain of Custody <input checked="" type="checkbox"/> Certificate of Analysis	
2. Are Discharge Monitoring Reports complete and correct? Month(s) reviewed: _____ May 2014, June 2014, July 2014	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
3. Are sample location(s) according to permit requirements (after all treatment unless otherwise specified)?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
4. Are sample collection, preservation, and holding times appropriate; and is sampling equipment adequate?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
5. Are grab and composite samples representative of the flow and the nature of the monitored activity?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
6. If analysis is performed at another location, are shipping procedures adequate? List parameters and name & address of contract lab(s): Commercial Labs: <ul style="list-style-type: none"> <u>Pace Analytical Service, Inc.</u> ID # 460221- Copper and Hardness 9800 Kincey Ave. Suite 100, Huntersville, NC 28078 <u>A&L Eastern Labs – Biosolids Analysis</u> (Cu, Zn, Cd, Ni, Pb, Ar, Hg, Se, Mo) 7621 Whitepine Rd. Richmond, VA 23237 ID#460014 Cert #2980 <u>Coastal Bioanalytics, Inc. –TMP</u> 6400 Enterprise Ct. Gloucester, VA 23061 ID # 460030 	
7. Are annual thermometer calibration(s) adequate? 11/11/2013	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
8. Parameters evaluated during this inspection (attach checklists): <div style="margin-left: 40px;"> <input type="checkbox"/> pH <input type="checkbox"/> Temperature <input type="checkbox"/> Total Residual Chlorine <input type="checkbox"/> Dissolved Oxygen <input type="checkbox"/> Biochemical Oxygen Demand <input type="checkbox"/> Total Suspended Solids <input type="checkbox"/> Other (specify) _____ <input type="checkbox"/> Other (specify) _____ <input type="checkbox"/> Other (specify) _____ </div>	
Comments: <ul style="list-style-type: none"> pH and D.O are collected at the outfall and taken back to the lab for analysis. These parameters are covered under the Lab's VELAP certification. 	

VA DEQ Focused CEI Tech/Lab Inspection Report

- Composite samples for CBOD₅, TSS, E.coli, and nutrients are run in the on-site lab and covered under VELAP certification (#450108 Cert #2903).

Permit #	VA0022802
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EFFLUENT FIELD DATA:

Flow	<input type="text"/> MGD	Dissolved Oxygen	<input type="text"/> mg/L	TRC (Contact Tank)	<input type="text"/> mg/L
pH	<input type="text"/> S.U.	Temperature	<input type="text"/> °C	TRC (Final Effluent)	<input type="text"/> mg/L

Was a Sampling Inspection conducted? ☐ Yes (see Sampling Inspection Report) ☒ No

CONDITION OF OUTFALL AND EFFLUENT CHARACTERISTICS:

1. Type of outfall: <input checked="" type="checkbox"/> Shore based <input type="checkbox"/> Submerged	Diffuser? <input type="checkbox"/> Yes <input type="checkbox"/> No
2. Are the outfall and supporting structures in good condition? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
3. Final Effluent (evidence of following problems):	
<input type="checkbox"/> Turbid effluent	<input type="checkbox"/> Visible foam
<input type="checkbox"/> Sludge bar	<input type="checkbox"/> Grease
<input type="checkbox"/> Unusual color	<input type="checkbox"/> Oil sheen
4. Is there a visible effluent plume in the receiving stream? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
5. Receiving stream: <input checked="" type="checkbox"/> No observed problems <input type="checkbox"/> Indication of problems (explain below)	
Comments: <u>Receiving stream is clear and odorless with no visible foam</u>	

REQUEST for CORRECTIVE ACTION:

1. None

NOTES and COMMENTS:

- | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Continue I&I evaluation of the collection system.</p> <p>2. Good housekeeping and good organization was displayed throughout the plant.</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|

VA DEQ Focused CEI Tech/Lab Inspection Report

Permit #

VA0022802

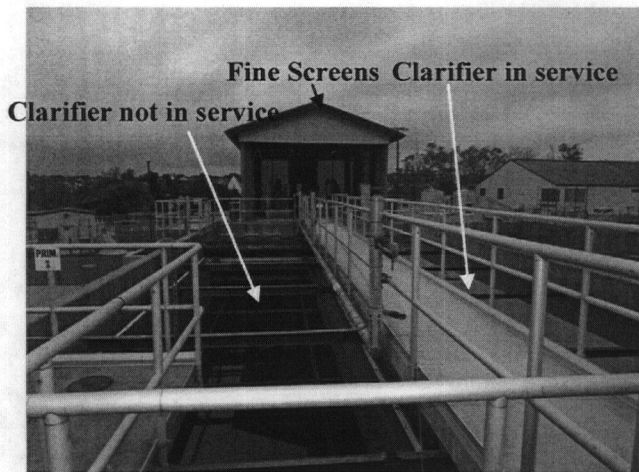


Photo 1.) Primary Clarifier and fine screens under cover

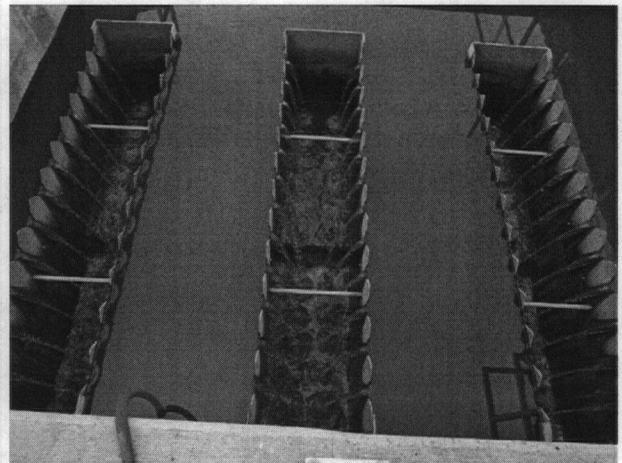


Photo 2.) Primary clarifier weirs



Photo 3.) Slight algae growth/ polymer stains



Photo 4.) BNR Tanks-color of rust from ferric

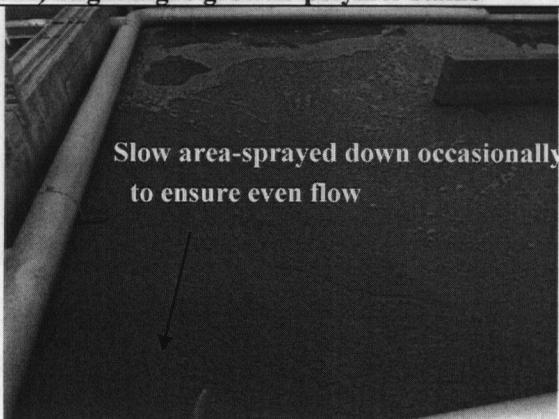


Photo 5.) BNR tank

Photos by: Lisa Janovsky

Layout by: Sharon Allen

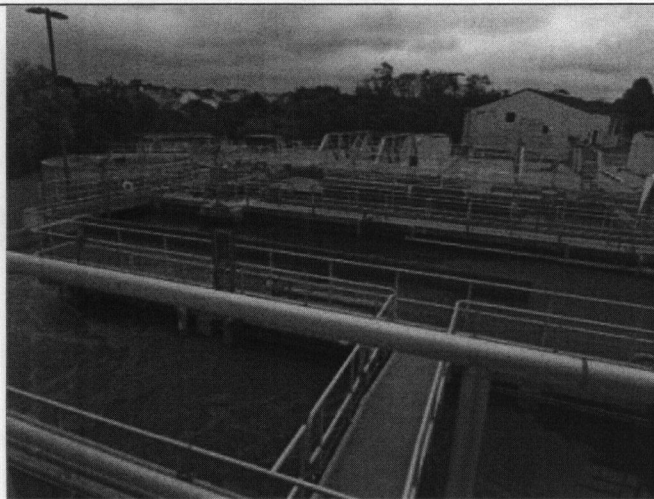


Photo 6.) Anoxic tank prior to membrane

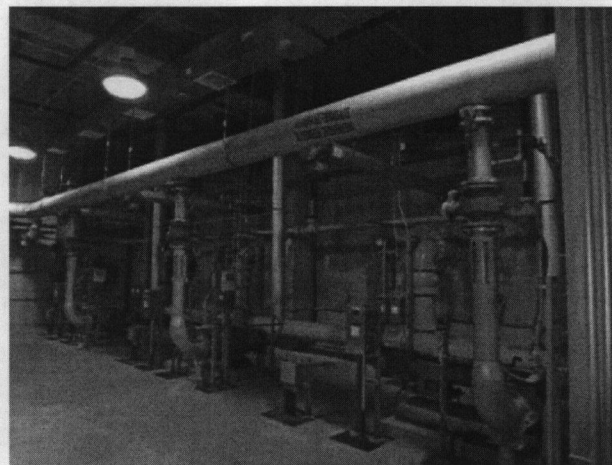
Permit # VA002802

September 10, 2014

VA DEQ Focused CEI Tech/Lab Inspection Report



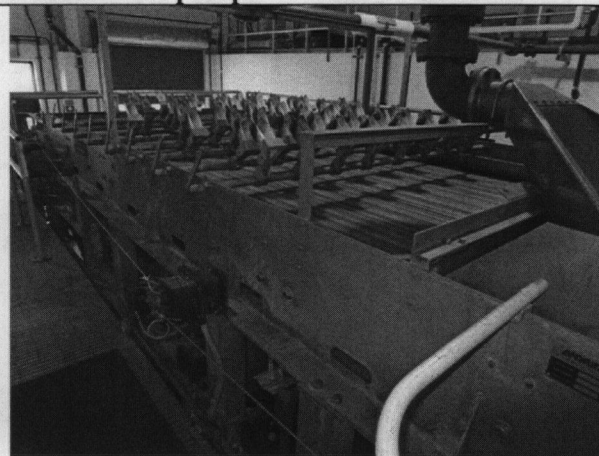
7. Plant overview



8. Membrane pumps



9. Good housekeeping-spare parts storage



10. Belt press-cleaned once/month



11. Outfall 001



12. Receiving Stream

Photos by: Lisa Janovsky

Permit # VA002802

Layout by: Sharon Allen

September 10, 2014

Attachment 5

To: Alison Thompson
From: Rebecca Shoemaker

Date: October 2, 2014
Subject: Planning Statement for Basham Simms WWTF
Permit Number: VA0022802

Information for Outfall 001:

Discharge Type: Municipal
Discharge Flow: 1.5 MGD
Receiving Stream: North Fork Goose Creek, UT
Latitude / Longitude: 39°07'09" 77°42'57"
Rivermile: 1.27
Streamcode: 1a-XAA
Waterbody: VAN-A06R
Water Quality Standards: Class III, Section 9, No Special Standards
Drainage Area: <5 sq miles

1. Please provide water quality monitoring information for the receiving stream segment. If there is not monitoring information for the receiving stream segment, please provide information on the nearest downstream monitoring station, including how far downstream the monitoring station is from the outfall.

This facility discharges to an unnamed tributary to North Fork Goose Creek (streamcode XAA). The closest monitoring station is DEQ ambient and biological monitoring station 1aNOG005.69, at Route 722, approximately 5.2 miles downstream from Outfall 001. The following is the water quality summary for this segment of North Fork Goose Creek, as taken from the 2012 Integrated Report:

DEQ monitoring stations located on this segment of the North Fork Goose Creek:

- *DEQ ambient and biological monitoring station 1aNOG005.69, at Route 722.*

Class III, Section 9.

E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. A fecal coliform TMDL for the North Fork Goose Creek watershed has been completed and approved.

Biological monitoring finds benthic macroinvertebrate impairments, resulting in an impaired classification for the aquatic life use. Citizen monitoring also indicates a medium probability of adverse conditions for biota.

The wildlife use is considered fully supporting. The fish consumption use was not assessed.

2. Does this facility discharge to a stream segment on the 303(d) list? If yes, please fill out Table A.

No.

3. Are there any downstream 303(d) listed impairments that are relevant to this discharge? If yes, please fill out Table B.

Table B. Information on Downstream 303(d) Impairments and TMDLs

Waterbody Name	Impaired Use	Cause	Distance From Outfall	TMDL completed	WLA	Basis for WLA	TMDL Schedule
Impairment Information in the 2012 Integrated Report							
North Fork Goose Creek	Aquatic Life	Benthic Macroinvertebrates	1.27 miles	No	---	---	2022
	Recreation	<i>E. coli</i>		Goose Creek Watershed Bacteria 05/01/2003	4.14E+12 cfu/year fecal coliform bacteria 2.61E+12 cfu/year <i>E. coli</i> bacteria*	200 cfu/100 ml fecal coliform 126 cfu/100 ml <i>E. coli</i> * --- 1.5 MGD	---
Goose Creek Reservoir	Fish Consumption	PCBs	19.7 miles	No	---	---	2018
Goose Creek	Aquatic Life	Benthic Macroinvertebrates	20.8 miles	Goose Creek Watershed Benthic 04/26/2004	27.4 tons sediment/year**	TSS concentration 12 mg/L --- 1.5 MGD	---

* The WLA is expressed in the Goose Creek Watershed Bacteria TMDL as cfu/year fecal coliform bacteria.

** This facility was assigned a WLA for 91.5 tons/year of TSS in the Benthic TMDL for the Goose Creek watershed. The total WLA was calculated based upon the assumption of the facility operating at five times the design flow, and the permitted maximum average concentration for TSS (mg/L). The factor of five for the design flow was used in the TMDL as a conservative measure to build in future growth in the watershed. Although the future growth for the watershed was determined by the existing design flow of each facility in the watershed, the future growth is available for both new and expanding permits in the watershed. The actual WLA in the Benthic TMDL for this facility without including the future growth is 18.3 tons/year, based on a design flow of 1.00 MGD. Since the approval of the Benthic TMDL for Goose Creek, this facility has updated the maximum flow tier to 1.50 MGD. Using a portion of the available future growth allocation in the TMDL, the WLA for this facility is 27.4 tons/year of TSS based on the revised design flow of 1.5 MGD.

4. Is there monitoring or other conditions that Planning/Assessment needs in the permit?

DEQ planning staff requests this facility continue nutrient monitoring, specifically total phosphorus, nitrate, nitrite, ammonia, and TKN. Nutrient monitoring is requested of facilities that are located within a five mile distance upstream of a benthic impairment.

There is a completed downstream TMDL for the aquatic life use impairment for the Chesapeake Bay. However, the Bay TMDL and the WLAs contained within the TMDL are not addressed in this planning statement.

Goose Creek Reservoir is listed with a PCB impairment and, in support of the PCB TMDL that is scheduled for development by 2018, this facility is a candidate for low-level PCB monitoring based upon its designation as a municipal facility. PCB monitoring was completed for this facility during the previous permit cycle; additional low-level PCB monitoring will not be requested for this facility at this time.

5. Fact Sheet Requirements – Please provide information regarding any drinking water intakes located within a 5 mile radius of the discharge point.

There are no public water supply intakes located within five miles of this discharge.

Attachment 6

FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Basham Simms WWTF
Receiving Stream: North Fork Goose Creek, UT

Permit No.: VA0022802

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information		Effluent Information	
Mean Hardness (as CaCO3) =	mg/L	1Q10 (Annual) =	0 MGD	Annual - 1Q10 Mix =	100 %	Mean Hardness (as CaCO3) =	137 mg/L
90% Temperature (Annual) =	deg C	7Q10 (Annual) =	0 MGD	- 7Q10 Mix =	100 %	90% Temp (Annual) =	25 deg C
90% Temperature (Wet season) =	deg C	30Q10 (Annual) =	0 MGD	- 30Q10 Mix =	100 %	90% Temp (Wet season) =	20 deg C
90% Maximum pH =	SU	1Q10 (Wet season) =	0.028 MGD	Wet Season - 1Q10 Mix =	100 %	90% Maximum pH =	8 SU
10% Maximum pH =	SU	30Q10 (Wet season) =	0.07 MGD	- 30Q10 Mix =	100 %	10% Maximum pH =	SU
Tier Designation (1 or 2) =	1	30Q5 =	0.016 MGD			Discharge Flow =	1.5 MGD
Public Water Supply (PWS) Y/N? =	n	Harmonic Mean =	0 MGD				
Trout Present Y/N? =	n						
Early Life Stages Present Y/N? =	y						

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	na	9.9E+02	--	--	na	1.0E+03	--	--	--	--	--	--	--	--	--	--	na	1.0E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	9.4E+00	--	--	--	--	--	--	--	--	--	--	na	9.4E+00
Acrylonitrile ^c	0	--	--	na	2.5E+00	--	--	na	2.5E+00	--	--	--	--	--	--	--	--	--	--	na	2.5E+00
Aldrin ^c	0	3.0E+00	--	na	5.0E-04	3.0E+00	--	na	5.0E-04	--	--	--	--	--	--	--	--	3.0E+00	--	na	5.0E-04
Ammonia-N (mg/l) (Yearly)	0	8.41E+00	1.24E+00	na	--	8.41E+00	1.24E+00	na	--	--	--	--	--	--	--	--	--	8.41E+00	1.24E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	5.84E+01	5.27E+00	na	--	5.95E+01	5.52E+00	na	--	--	--	--	--	--	--	--	--	5.95E+01	5.52E+00	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	4.0E+04	--	--	--	--	--	--	--	--	--	--	na	4.0E+04
Antimony	0	--	--	na	6.4E+02	--	--	na	6.5E+02	--	--	--	--	--	--	--	--	--	--	na	6.5E+02
Arsenic	0	3.4E+02	1.5E+02	na	--	3.4E+02	1.5E+02	na	--	--	--	--	--	--	--	--	--	3.4E+02	1.5E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene ^c	0	--	--	na	5.1E+02	--	--	na	5.1E+02	--	--	--	--	--	--	--	--	--	--	na	5.1E+02
Benzidine ^c	0	--	--	na	2.0E-03	--	--	na	2.0E-03	--	--	--	--	--	--	--	--	--	--	na	2.0E-03
Benzo (a) anthracene ^c	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Benzo (b) fluoranthene ^c	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Benzo (k) fluoranthene ^c	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Benzo (a) pyrene ^c	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Bis(2-Chloroethyl) Ether ^c	0	--	--	na	5.3E+00	--	--	na	5.3E+00	--	--	--	--	--	--	--	--	--	--	na	5.3E+00
Bis(2-Chloroisopropyl) Ether	0	--	--	na	6.5E+04	--	--	na	6.6E+04	--	--	--	--	--	--	--	--	--	--	na	6.6E+04
Bis 2-Ethylhexyl Phthalate ^c	0	--	--	na	2.2E+01	--	--	na	2.2E+01	--	--	--	--	--	--	--	--	--	--	na	2.2E+01
Bromoform ^c	0	--	--	na	1.4E+03	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	1.4E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	1.9E+03
Cadmium	0	5.6E+00	1.5E+00	na	--	5.6E+00	1.5E+00	na	--	--	--	--	--	--	--	--	--	5.6E+00	1.5E+00	na	--
Carbon Tetrachloride ^c	0	--	--	na	1.6E+01	--	--	na	1.6E+01	--	--	--	--	--	--	--	--	--	--	na	1.6E+01
Chlordane ^c	0	2.4E+00	4.3E-03	na	8.1E-03	2.4E+00	4.3E-03	na	8.1E-03	--	--	--	--	--	--	--	--	2.4E+00	4.3E-03	na	8.1E-03
Chloride	0	8.6E+05	2.3E+05	na	--	8.6E+05	2.3E+05	na	--	--	--	--	--	--	--	--	--	8.6E+05	2.3E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	1.9E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.9E+01	1.1E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	1.6E+03	--	--	--	--	--	--	--	--	--	--	na	1.6E+03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane ^c	0	--	--	na	1.3E+02	--	--	na	1.3E+02	--	--	--	--	--	--	--	--	--	--	na	1.3E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	1.6E+03	--	--	--	--	--	--	--	--	--	--	na	1.6E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	1.5E+02	--	--	--	--	--	--	--	--	--	--	na	1.5E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.3E-02	4.1E-02	na	--	--	--	--	--	--	--	--	--	8.3E-02	4.1E-02	na	--
Chromium III	0	7.4E+02	9.6E+01	na	--	7.4E+02	9.6E+01	na	--	--	--	--	--	--	--	--	--	7.4E+02	9.6E+01	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.6E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.6E+01	1.1E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene ^c	0	--	--	na	1.8E-02	--	--	na	1.8E-02	--	--	--	--	--	--	--	--	--	--	na	1.8E-02
Copper	0	1.8E+01	1.2E+01	na	--	1.8E+01	1.2E+01	na	--	--	--	--	--	--	--	--	--	1.8E+01	1.2E+01	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.2E+01	5.2E+00	na	1.6E+04	--	--	--	--	--	--	--	--	2.2E+01	5.2E+00	na	1.6E+04
DDD ^c	0	--	--	na	3.1E-03	--	--	na	3.1E-03	--	--	--	--	--	--	--	--	--	--	na	3.1E-03
DDE ^c	0	--	--	na	2.2E-03	--	--	na	2.2E-03	--	--	--	--	--	--	--	--	--	--	na	2.2E-03
DDT ^c	0	1.1E+00	1.0E-03	na	2.2E-03	1.1E+00	1.0E-03	na	2.2E-03	--	--	--	--	--	--	--	--	1.1E+00	1.0E-03	na	2.2E-03
Demeton	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	1.7E-01	1.7E-01	na	--	--	--	--	--	--	--	--	--	1.7E-01	1.7E-01	na	--
Dibenz(a,h)anthracene ^c	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	--	--	na	1.3E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	9.7E+02	--	--	--	--	--	--	--	--	--	--	na	9.7E+02
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	1.9E+02	--	--	--	--	--	--	--	--	--	--	na	1.9E+02
3,3-Dichlorobenzidine ^c	0	--	--	na	2.8E-01	--	--	na	2.8E-01	--	--	--	--	--	--	--	--	--	--	na	2.8E-01
Dichlorobromomethane ^c	0	--	--	na	1.7E+02	--	--	na	1.7E+02	--	--	--	--	--	--	--	--	--	--	na	1.7E+02
1,2-Dichloroethane ^c	0	--	--	na	3.7E+02	--	--	na	3.7E+02	--	--	--	--	--	--	--	--	--	--	na	3.7E+02
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	7.2E+03	--	--	--	--	--	--	--	--	--	--	na	7.2E+03
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	1.0E+04	--	--	--	--	--	--	--	--	--	--	na	1.0E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	2.9E+02	--	--	--	--	--	--	--	--	--	--	na	2.9E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane ^c	0	--	--	na	1.5E+02	--	--	na	1.5E+02	--	--	--	--	--	--	--	--	--	--	na	1.5E+02
1,3-Dichloropropene ^c	0	--	--	na	2.1E+02	--	--	na	2.1E+02	--	--	--	--	--	--	--	--	--	--	na	2.1E+02
Dieldrin ^c	0	2.4E-01	5.6E-02	na	5.4E-04	2.4E-01	5.6E-02	na	5.4E-04	--	--	--	--	--	--	--	--	2.4E-01	5.6E-02	na	5.4E-04
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	4.4E+04	--	--	--	--	--	--	--	--	--	--	na	4.4E+04
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	8.6E+02	--	--	--	--	--	--	--	--	--	--	na	8.6E+02
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	1.1E+06	--	--	--	--	--	--	--	--	--	--	na	1.1E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	4.5E+03	--	--	--	--	--	--	--	--	--	--	na	4.5E+03
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	5.4E+03	--	--	--	--	--	--	--	--	--	--	na	5.4E+03
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	2.8E+02	--	--	--	--	--	--	--	--	--	--	na	2.8E+02
2,4-Dinitrotoluene ^c	0	--	--	na	3.4E+01	--	--	na	3.4E+01	--	--	--	--	--	--	--	--	--	--	na	3.4E+01
Dioxin 2,3,7,8- tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	5.2E-08	--	--	--	--	--	--	--	--	--	--	na	5.2E-08
1,2-Diphenylhydrazine ^c	0	--	--	na	2.0E+00	--	--	na	2.0E+00	--	--	--	--	--	--	--	--	--	--	na	2.0E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	9.0E+01	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	9.0E+01
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	9.0E+01	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	9.0E+01
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.2E-01	5.6E-02	--	--	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	9.0E+01	--	--	--	--	--	--	--	--	--	--	na	9.0E+01
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	8.6E-02	3.6E-02	na	6.1E-02	--	--	--	--	--	--	--	--	8.6E-02	3.6E-02	na	6.1E-02
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	3.0E-01	--	--	--	--	--	--	--	--	--	--	na	3.0E-01

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		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	2.1E+03	--	--	--	--	--	--	--	--	--	--	na	2.1E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	--	--	na	1.4E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	5.4E+03	--	--	--	--	--	--	--	--	--	--	na	5.4E+03
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	1.0E-02	na	--	--	--	--	--	--	--	--	--	--	1.0E-02	na	--
Heptachlor ^C	0	5.2E-01	3.8E-03	na	7.9E-04	5.2E-01	3.8E-03	na	7.9E-04	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	7.9E-04
Heptachlor Epoxide ^C	0	5.2E-01	3.8E-03	na	3.9E-04	5.2E-01	3.8E-03	na	3.9E-04	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	3.9E-04
Hexachlorobenzene ^C	0	--	--	na	2.9E-03	--	--	na	2.9E-03	--	--	--	--	--	--	--	--	--	--	na	2.9E-03
Hexachlorobutadiene ^C	0	--	--	na	1.8E+02	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	--	--	na	1.8E+02
Hexachlorocyclohexane Alpha-BHC ^C	0	--	--	na	4.9E-02	--	--	na	4.9E-02	--	--	--	--	--	--	--	--	--	--	na	4.9E-02
Hexachlorocyclohexane Beta-BHC ^C	0	--	--	na	1.7E-01	--	--	na	1.7E-01	--	--	--	--	--	--	--	--	--	--	na	1.7E-01
Hexachlorocyclohexane Gamma-BHC ^C (Lindane)	0	9.5E-01	na	na	1.8E+00	9.5E-01	--	na	1.8E+00	--	--	--	--	--	--	--	--	9.5E-01	--	na	1.8E+00
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	1.1E+03	--	--	--	--	--	--	--	--	--	--	na	1.1E+03
Hexachloroethane ^C	0	--	--	na	3.3E+01	--	--	na	3.3E+01	--	--	--	--	--	--	--	--	--	--	na	3.3E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	2.0E+00	na	--	--	--	--	--	--	--	--	--	--	2.0E+00	na	--
Indeno (1,2,3-cd) pyrene ^C	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone ^C	0	--	--	na	9.6E+03	--	--	na	9.6E+03	--	--	--	--	--	--	--	--	--	--	na	9.6E+03
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	1.8E+02	2.0E+01	na	--	1.8E+02	2.0E+01	na	--	--	--	--	--	--	--	--	--	1.8E+02	2.0E+01	na	--
Malathion	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	1.4E+00	7.7E-01	--	--	--	--	--	--	--	--	--	--	1.4E+00	7.7E-01	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	1.5E+03	--	--	--	--	--	--	--	--	--	--	na	1.5E+03
Methylene Chloride ^C	0	--	--	na	5.9E+03	--	--	na	5.9E+03	--	--	--	--	--	--	--	--	--	--	na	5.9E+03
Methoxychlor	0	--	3.0E-02	na	--	--	3.0E-02	na	--	--	--	--	--	--	--	--	--	--	3.0E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Nickel	0	2.4E+02	2.6E+01	na	4.6E+03	2.4E+02	2.6E+01	na	4.6E+03	--	--	--	--	--	--	--	--	2.4E+02	2.6E+01	na	4.6E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	7.0E+02	--	--	--	--	--	--	--	--	--	--	na	7.0E+02
N-Nitrosodimethylamine ^C	0	--	--	na	3.0E+01	--	--	na	3.0E+01	--	--	--	--	--	--	--	--	--	--	na	3.0E+01
N-Nitrosodiphenylamine ^C	0	--	--	na	6.0E+01	--	--	na	6.0E+01	--	--	--	--	--	--	--	--	--	--	na	6.0E+01
N-Nitrosodi-n-propylamine ^C	0	--	--	na	5.1E+00	--	--	na	5.1E+00	--	--	--	--	--	--	--	--	--	--	na	5.1E+00
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.8E+01	6.6E+00	na	--	--	--	--	--	--	--	--	--	2.8E+01	6.6E+00	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	6.5E-02	1.3E-02	na	--	--	--	--	--	--	--	--	--	6.5E-02	1.3E-02	na	--
PCB Total ^C	0	--	1.4E-02	na	6.4E-04	--	1.4E-02	na	6.4E-04	--	--	--	--	--	--	--	--	--	1.4E-02	na	6.4E-04
Pentachlorophenol ^C	0	7.7E-03	5.9E-03	na	3.0E+01	7.7E-03	5.9E-03	na	3.0E+01	--	--	--	--	--	--	--	--	7.7E-03	5.9E-03	na	3.0E+01
Phenol	0	--	--	na	8.6E+05	--	--	na	8.7E+05	--	--	--	--	--	--	--	--	--	--	na	8.7E+05
Pyrene	0	--	--	na	4.0E+03	--	--	na	4.0E+03	--	--	--	--	--	--	--	--	--	--	na	4.0E+03
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	2.0E+01	5.0E+00	na	4.2E+03	--	--	--	--	--	--	--	--	2.0E+01	5.0E+00	na	4.2E+03
Silver	0	5.9E+00	--	na	--	5.9E+00	--	na	--	--	--	--	--	--	--	--	--	5.9E+00	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,1,2,2-Tetrachloroethane ^C	0	--	--	na	4.0E+01	--	--	na	4.0E+01	--	--	--	--	--	--	--	--	--	--	na	4.0E+01
Tetrachloroethylene ^C	0	--	--	na	3.3E+01	--	--	na	3.3E+01	--	--	--	--	--	--	--	--	--	--	na	3.3E+01
Thallium	0	--	--	na	4.7E-01	--	--	na	4.8E-01	--	--	--	--	--	--	--	--	--	--	na	4.8E-01
Toluene	0	--	--	na	6.0E+03	--	--	na	6.1E+03	--	--	--	--	--	--	--	--	--	--	na	6.1E+03
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Toxaphene ^C	0	7.3E-01	2.0E-04	na	2.8E-03	7.3E-01	2.0E-04	na	2.8E-03	--	--	--	--	--	--	--	--	7.3E-01	2.0E-04	na	2.8E-03
Tributyltin	0	4.6E-01	7.2E-02	na	--	4.6E-01	7.2E-02	na	--	--	--	--	--	--	--	--	--	4.6E-01	7.2E-02	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	7.1E+01	--	--	--	--	--	--	--	--	--	--	na	7.1E+01
1,1,2-Trichloroethane ^C	0	--	--	na	1.6E+02	--	--	na	1.6E+02	--	--	--	--	--	--	--	--	--	--	na	1.6E+02
Trichloroethylene ^C	0	--	--	na	3.0E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
2,4,6-Trichlorophenol ^C	0	--	--	na	2.4E+01	--	--	na	2.4E+01	--	--	--	--	--	--	--	--	--	--	na	2.4E+01
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Vinyl Chloride ^C	0	--	--	na	2.4E+01	--	--	na	2.4E+01	--	--	--	--	--	--	--	--	--	--	na	2.4E+01
Zinc	0	1.5E+02	1.5E+02	na	2.6E+04	1.5E+02	1.5E+02	na	2.6E+04	--	--	--	--	--	--	--	--	1.5E+02	1.5E+02	na	2.6E+04

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = $(0.25(WQC - \text{background conc.}) + \text{background conc.})$ for acute and chronic
= $(0.1(WQC - \text{background conc.}) + \text{background conc.})$ for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	6.5E+02
Arsenic	9.0E+01
Barium	na
Cadmium	8.7E-01
Chromium III	5.8E+01
Chromium VI	6.4E+00
Copper	7.0E+00
Iron	na
Lead	1.2E+01
Manganese	na
Mercury	4.6E-01
Nickel	1.6E+01
Selenium	3.0E+00
Silver	2.4E+00
Zinc	6.1E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

Total Hardness for VA0022802 Basham Simms WWTF

Monitoring Period	Total Hardness (mg/L as CaCO ₃)
April through June 2010	113
July through September 2010	113
October through December 2010	125
January through March 2011	124
April through June 2011	131
July through September 2011	131
October through December 2011	131
January through March 2012	135
April through June 2012	136
July through September 2012	136
October through December 2012	136
January through March 2013	135
April through June 2013	140
July through September 2013	140
October through December 2013	144
January through March 2014	158
April through June 2014	163
July through September 2014	163
Application Form 2A Testing 5/15/2014	140
Application Form 2A Testing 6/3/2014	136
Application Form 2A Testing 7/8/2014	142
Average Total Hardness	137 mg/L as CaCO ₃

Maximum pH values for VA0022802 Basham Simms WWTF**(As reported on the Discharge Monitoring Reports for Outfall 002)**

Month/Year	pH (S.U.)
January 2011	8
February 2011	7.9
March 2011	7.8
April 2011	7.8
May 2011	7.9
June 2011	7.9
July 2011	8
August 2011	8
September 2011	8
October 2011	8
November 2011	8.1
December 2011	7.9
January 2012	8
February 2012	7.9
March 2012	7.9
April 2012	7.9
May 2012	7.9
June 2012	7.9
July 2012	7.9
August 2012	7.9
September 2012	7.9
October 2012	7.8
November 2012	7.8
December 2012	7.8
January 2013	7.8
February 2013	7.7
March 2013	7.8
April 2013	7.8
May 2013	7.8
June 2013	7.9
July 2013	7.9
August 2013	7.9
September 2013	8
October 2013	7.7
November 2013	7.9
December 2013	8
January 2014	8
February 2014	7.7
March 2014	7.8
April 2014	7.7
May 2014	7.7
June 2014	7.7
July 2014	7.9
August 2014	7.9

September 2014	8.9
October 2014	8.1
November 2014	7.9
90th percentile	8 S.U.

Attachment 7

Thompson, Alison (DEQ)

From: Aschenbach, Ernie (DGIF)
Sent: Tuesday, October 07, 2014 3:43 PM
To: Thompson, Alison (DEQ); Daub, Eleanore (DEQ); nhreview (DCR)
Cc: ProjectReview (DGIF); Cason, Gladys (DGIF)
Subject: ESSLog 23144; VPDES issuance DEQ# VA-0022802 for the Basham Simms Wastewater Treatment Facility Upgrade & Expansion in Loudoun County, VA.

VPDES issuance DEQ# VA-0022802 for the Basham Simms Wastewater Treatment Facility Upgrade & Expansion in Loudoun County, VA. According to the application, the discharge (flow) is currently 1.0 million gallons per day (MGD) with the proposed increase to 1.5 MGD. The existing Ammonia as Nitrogen is 3.0 mg/L weekly- and 2.2 mg/L monthly-average. Proposed discharge Ammonia as Nitrogen is 2.9 mg/L weekly- and 2.3 mg/L monthly-average. The receiving water is an unnamed tributary to North Fork Goose Creek. The 7Q10 is 0.03 MGD. Based on the low-flow of the receiving stream, we anticipate this may be an intermittent stream.

According to our records, North Fork Goose Creek is predicted habitat for the state Threatened (ST) green floater. In general, we recommend ultraviolet (UV) disinfection (rather than chlorination disinfection), if practicable. If chlorination becomes necessary and is used, we recommend dechlorination, prior to discharge. Freshwater mussels are known to be sensitive to ammonia. The ammonia limits within the 2013 EPA rule are the best information currently available regarding ammonia levels protective of mussels (not T&E mussels, any mussel species). Therefore, we recommend the EPA values being implemented in this permit for this and all future VPDES permits, if practicable. Provided adherence to the effluent characteristics and permit conditions, we do not anticipate the reissuance of this permit to result in adverse impact to resources under our purview.

This project is located within 2 miles of a documented occurrence of a state or federal threatened or endangered plant or insect species and/or other Natural Heritage coordination species. Therefore, we recommend and support coordination with VDCR-DNH regarding the protection of these resources.

Thanks.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230
Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov

Known or likely to occur within a 2 mile radius around point
39,07,09.0 77,42,57.0
in 107 Loudoun County, VA

[View Map of
Site Location](#)

440 Known or Likely Species ordered by Status Concern for Conservation
(displaying first 22) (22 species with Status* or Tier I** or Tier II**)

<u>BOVA Code</u>	<u>Status*</u>	<u>Tier**</u>	<u>Common Name</u>	<u>Scientific Name</u>	<u>Confirmed</u>	<u>Database(s)</u>
030062	ST	I	<u>Turtle, wood</u>	Glyptemys insculpta		BOVA
040129	ST	I	<u>Sandpiper, upland</u>	Bartramia longicauda		BOVA
040293	ST	I	<u>Shrike, loggerhead</u>	Lanius ludovicianus		BOVA
040379	ST	I	<u>Sparrow, Henslow's</u>	Ammodramus henslowii		BOVA
060081	ST	II	<u>Floater, green</u>	Lasmigona subviridis	<u>Yes</u>	BOVA,TEWaters,Habitat
040292	ST		<u>Shrike, migrant loggerhead</u>	Lanius ludovicianus migrans		BOVA
050022	FP		<u>Bat, northern long-eared</u>	Myotis septentrionalis		BOVA
100248	FS	I	<u>Fritillary, regal</u>	Speyeria idalia idalia		BOVA
040093	FS	II	<u>Eagle, bald</u>	Haliaeetus leucocephalus		BOVA
100166	FS	II	<u>Skipper, Dotted</u>	Hesperia attalus slossonae		BOVA
030063	CC	III	<u>Turtle, spotted</u>	Clemmys guttata		BOVA
030012	CC	IV	<u>Rattlesnake, timber</u>	Crotalus horridus		BOVA
040372		I	<u>Crossbill, red</u>	Loxia curvirostra		BOVA
040225		I	<u>Sapsucker, yellow-bellied</u>	Sphyrapicus varius		BOVA
040319		I	<u>Warbler, black- throated green</u>	Dendroica virens		BOVA
040306		I	<u>Warbler, golden-winged</u>	Vermivora chrysoptera		BOVA
040052		II	<u>Duck, American black</u>	Anas rubripes		BOVA

040036		II	<u>Night-heron,</u> <u>yellow-</u> <u>crowned</u>	Nyctanassa violacea violacea	BOVA
040213		II	<u>Owl, northern</u> <u>saw-whet</u>	Aegolius acadicus	BOVA
040105		II	<u>Rail, king</u>	Rallus elegans	BOVA
040320		II	<u>Warbler,</u> <u>cerulean</u>	Dendroica cerulea	BOVA
040266		II	<u>Wren, winter</u>	Troglodytes troglodytes	BOVA

To view **All 440 species** [View 440](#)

* FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FP=Federal Proposed; FC=Federal Candidate; FS=Federal Species of Concern; CC=Collection Concern

** I=VA Wildlife Action Plan - Tier I - Critical Conservation Need; II=VA Wildlife Action Plan - Tier II - Very High Conservation Need; III=VA Wildlife Action Plan - Tier III - High Conservation Need; IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need

Bat Colonies or Hibernacula: **Not Known**

Anadromous Fish Use Streams

N/A

Colonial Water Bird Survey

N/A

Threatened and Endangered Waters (1 Reach)

[View Map of All
Threatened and Endangered
Waters](#)

Stream Name	T&E Waters Species						View Map	
	Highest TE [*]	BOVA Code, Status [*] , Tier ^{**} , Common & Scientific Name						
<u>North Fork Goose Creek</u> (02070008)	ST	060081		ST		II <u>Floater, green</u>	Lasmigona subviridis	<u>Yes</u>

Managed Trout Streams

N/A

Bald Eagle Concentration Areas and Roosts

N/A

Bald Eagle Nests

N/A

Habitat Predicted for Aquatic WAP Tier I & II Species (1 Reach)

[View Map Combined Reaches from Below of Habitat Predicted for WAP Tier I & II Aquatic Species](#)

Stream Name	Tier Species						View Map
	Highest TE [*]	BOVA Code, Status [*] , Tier ^{**} , Common & Scientific Name					
North Fork Goose Creek (20700081)	ST	060081		ST		II Floater, green	Lasmigona subviridis <u>Yes</u>

Habitat Predicted for Terrestrial WAP Tier I & II Species

N/A

Public Holdings:

N/A

Compiled on 8/14/2014, 7:22:28 AM 1576686.0 report=IPA searchType= R dist= 3218 poi= 39,07,09.0 77,42,57.0
PixelSize=64; Anadromous=0.02428; BECAR=0.024458; Bats=0.024062; Buffer=0.178152; County=0.055279; Impediments=0.026019; Init=0.219676; PublicLands=0.025777;
SppObs=0.758398; TEWaters=0.057014; TierReaches=0.092753; TierTerrestrial=0.059154; Total=1.637636; Trout=0.045386

VaFWIS - Department of Game and Inland Fisheries

39,07,09.0 -77,42,57.0
is the Search Point
Submit Cancel

Search Point

- ☒ Change to "clicked" map point
- ☐ Fixed at 39,07,09.0 - 77,42,57.0

Show Position Rings

- ☒ Yes ☐ No
- 1 mile and 1/4 mile at the Search Point

Show Search Area

- ☒ Yes ☐ No
- 2 Search distance miles radius

Search Point is at map center

Base Map Choices

Topography

Map Overlay Choices

Current List: Position, Search

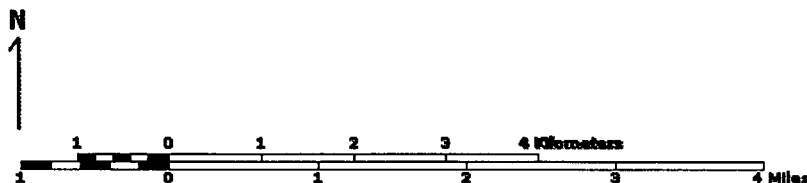
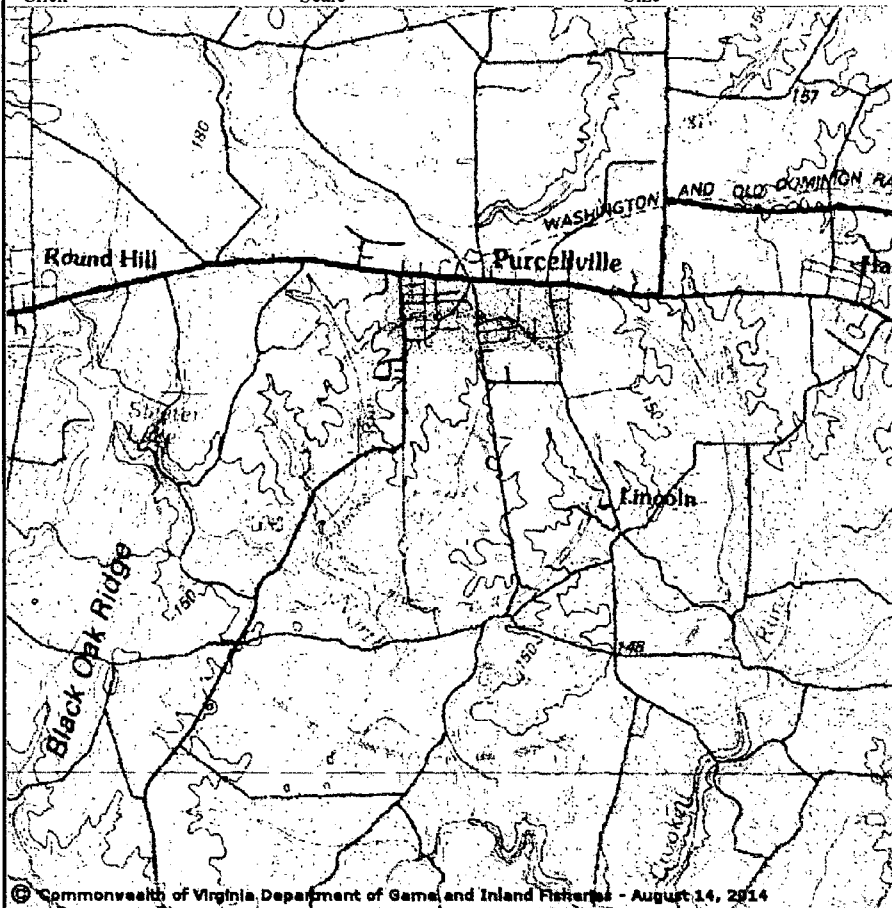
Map Overlay Legend

Position Rings
1 mile and 1/4 mile at the Search Point

2 mile radius Search Area

Refresh Browser Page

Map Click **pan** **M** Map Scale **In** **Zoom** **Out** Screen Size **Small** **Size** **Big** **Help**



Point of Search 39,07,09.0 -77,42,57.0

Map Location 39,07,09.0 -77,42,57.0

Select Coordinate System: ☒ Degrees, Minutes, Seconds Latitude - Longitude

☐ Decimal Degrees Latitude - Longitude

☐ Meters UTM NAD83 East North Zone

☐ Meters UTM NAD27 East North Zone

Base Map source: USGS 1:100,000 topographic maps (see Microsoft.terraserver-usa.com for details)

Map projection is UTM Zone 18 NAD 1983 with left 260410 and top 433813. Pixel size is 16 meters. Coordinates displayed are Degrees, Minutes, Seconds North and West. Map is currently displayed as 600 columns by 600 rows for a total of 360000 pixels. The map display represents 9600 meters east to west by 9600 meters north to south for a total of 92.1 square kilometers. The map display represents 31501 feet east to west by 31501 feet north to south for a total of 35.5 square miles.

Topographic maps and Black and white aerial photography for year 1990+-

are from the United States Department of the Interior, United States Geological Survey.
Color aerial photography aquired 2002 is from Virginia Base Mapping Program, Virginia
Geographic Information Network.
Shaded topographic maps are from TOPO! ©2006 National Geographic
<http://www.national.geographic.com/topo>
All other map products are from the Commonwealth of Virginia Department of Game and Inland
Fisheries.

map assembled 2014-08-14 07:21:39 (qa/qc December 5, 2012 8:04 - tn=576686 dist=3218
1)
\$poi=39.1191666-77.7158333

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Attachment 8

12/30/2014 12:48:17 PM

Facility = Basham Simms WWTF

Chemical = Ammonia

Chronic averaging period = 30

WLAa = 8.41

WLAc = 1.24

Q.L. = .2

samples/mo. = 4

samples/wk. = 1

Summary of Statistics:

observations = 1

Expected Value = 9

Variance = 29.16

C.V. = 0.6

97th percentile daily values = 21.9007

97th percentile 4 day average = 14.9741

97th percentile 30 day average = 10.8544

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity

Maximum Daily Limit = 2.50191091583623

Average Weekly limit = 2.50191091583623

Average Monthly Limit = 1.71062084695778

The data are:

11/22/2005 1:54:39 PM

Facility = Basham Simms WWTF

Chemical = Ammonia as N

Chronic averaging period = 30

WLAa = 20

WLAc = 2.2

Q.L. = .2

samples/mo. = 20

samples/wk. = 5

1.5 MGD
existing limitation

Summary of Statistics:

observations = 1

Expected Value = 9

Variance = 29.16

C.V. = 0.6

97th percentile daily values = 21.9007

97th percentile 4 day average = 14.9741

97th percentile 30 day average = 10.8544

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity

Maximum Daily Limit = 4.43887420551588

Average Weekly limit = 2.8930731937633

Average Monthly Limit = 2.28447445814844

The data are:

Attachment 9

12/30/2014 12:42:35 PM

Facility = Basham Simms WWTF

Chemical = Zinc

Chronic averaging period = 4

WLAa = 150

WLAc = 150

Q.L. = 10.0

samples/mo. = 1

samples/wk. = 1

Summary of Statistics:

observations = 3

Expected Value = 33.5666

Variance = 405.619

C.V. = 0.6

97th percentile daily values = 81.6817

97th percentile 4 day average = 55.8478

97th percentile 30 day average = 40.4831

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

37

32.6

31.1

12/30/2014 12:44:19 PM

Facility = Basham Simms WWTF

Chemical = Nickel

Chronic averaging period = 4

WLAa = 240

WLAc = 26

Q.L. = 5.0

samples/mo. = 1

samples/wk. = 1

Summary of Statistics:

observations = 3

Expected Value = 4.63874

Variance = 7.74646

C.V. = 0.6

97th percentile daily values = 11.2880

97th percentile 4 day average = 7.71789

97th percentile 30 day average = 5.59457

< Q.L. = 2

Model used = BPJ Assumptions, Type 1 data

No Limit is required for this material

The data are:

5.4

0 (<5.0 ug/L)

0 (<5.0 ug/L)

12/30/2014 12:43:32 PM

Facility = Basham Simms WWTF

Chemical = Selenium

Chronic averaging period = 4

WLAa = 20

WLAc = 5

Q.L. = 10.0

samples/mo. = 1

samples/wk. = 1

Summary of Statistics:

observations = 3

Expected Value = 9.27748

Variance = 30.9858

C.V. = 0.6

97th percentile daily values = 22.5760

97th percentile 4 day average = 15.4357

97th percentile 30 day average = 11.1891

< Q.L. = 2

Model used = BPJ Assumptions, Type 1 data

A limit is needed based on Chronic Toxicity

Maximum Daily Limit = 7.31287392026616

Average Weekly limit = 7.31287392026616

Average Monthly Limit = 7.31287392026616

The data are:

15

0 (~~10~~10.0 ug/L)

0 (~~10~~10.0 ug/L)

Attachment 10

2/23/2015 9:51:38 AM

Facility = Basham Simms WWTF

Chemical = Copper

Chronic averaging period = 4

WLAa = 18

WLAc = 12

Q.L. = 5

samples/mo. = 1

samples/wk. = 1

Summary of Statistics:

observations = 23

Expected Value = 10.5805

Variance = 41.2664

C.V. = 0.607143

97th percentile daily values = 25.6731

97th percentile 4 day average = 17.0231

97th percentile 30 day average = 12.6341

< Q.L. = 5

Model used = delta lognormal

A limit is needed based on Acute Toxicity

Maximum Daily Limit = 18

Average Weekly limit = 18

Average Monthly Limit = 18

The data are:

14.5

14.4

10.8

41.4

12.4

8.3

8.1

7.1

17.9

15.8

13.5

8.7

0

7.9

6.1

9.3

5.3

0

0

0

0
13.8
5.7

Dissolved Copper for VA0022802 Basham Simms WWTF

Monitoring Period	Dissolved Copper (ug/L)
April through June 2010	14.5
July through September 2010	14.4
October through December 2010	10.8
January through March 2011	41.4
April through June 2011	12.4
July through September 2011	8.3
October through December 2011	8.1
January through March 2012	7.1
April through June 2012	17.9
July through September 2012	15.8
October through December 2012	13.5
January through March 2013	8.7
April through June 2013	<5.0
July through September 2013	7.9
October through December 2013	6.1
January through March 2014	9.3
April through June 2014	5.3
July through September 2014	<5.0
October through December 2014	13.8
January through March 2015	<5.0
Application Form 2A Testing 5/15/2014	<5.0
Application Form 2A Testing 6/3/2014	<5.0
Application Form 2A Testing 7/8/2014	<5.0

Attachment 11

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to NF GOOSE CREEK.

File Information

File Name: U:\Water Permits\VPDES Program\Facility Archive\Basham Simms WQMF
Date Modified: January 04, 2006

Model Run #1

Water Quality Standards Information

Stream Name: NF GOOSE CREEK
River Basin: Potomac/Shenandoah Rivers Basin
Section: 9
Class: III - Nontidal Waters (Coastal and Piedmont)
Special Standards: none

Background Flow Information

Gauge Used: Taylorstown
Gauge Drainage Area: 89.96 Sq.Mi.
Gauge 7Q10 Flow: 1.02 MGD
Headwater Drainage Area: 5 Sq.Mi.
Headwater 7Q10 Flow: 5.669186E-02 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges: 0 MGD
Incremental Flow in Segments: 1.133837E-02 MGD/Sq.Mi.

Background Water Quality

Background Temperature: 25 Degrees C
Background cBOD5: 2 mg/l
Background TKN: 0 mg/l
Background D.O.: 7.383517 mg/l

Model Segmentation

Number of Segments: 2
Model Start Elevation: 450 ft above MSL
Model End Elevation: 310 ft above MSL

Use output for Segment 1
as input for Model Run #2

Model Run #1 + #2
demonstrate existing
design flows + limits

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to NF GOOSE CREEK.

Segment Information for Segment 1

Definition Information

Segment Definition: A discharge enters.
Discharge Name: BASHAM SIMMS
VPDES Permit No.:

Discharger Flow Information

Flow: 1 MGD
cBOD5: 12 mg/l
TKN: 5 mg/l
D.O.: 6 mg/l
Temperature: 25 Degrees C

} existing flow limits

Geographic Information

Segment Length: 1.62 miles
Upstream Drainage Area: 5 Sq.Mi.
Downstream Drainage Area: 17.41 Sq.Mi.
Upstream Elevation: 450 Ft.
Downstream Elevation: 360 Ft.

Hydraulic Information

Segment Width: 3.801 Ft.
Segment Depth: 0.515 Ft.
Segment Velocity: 0.835 Ft./Sec.
Segment Flow: 1.057 MGD
Incremental Flow: 0.141 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular
Character: Mostly Straight
Pool and Riffle: No
Bottom Type: Silt
Sludge: None
Plants: Few
Algae: Only On Edges

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to NF GOOSE CREEK.

Segment Information for Segment 2

Definition Information

Segment Definition:	A tributary enters.
Tributary Name:	UT

Tributary Flow Information

Flow:	0.2 MGD
cBOD5:	2 mg/l
TKN:	0 mg/l
D.O.:	7.407 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	4.6 miles
Upstream Drainage Area:	17.41 Sq.Mi.
Downstream Drainage Area:	25.34 Sq.Mi.
Upstream Elevation:	360 Ft.
Downstream Elevation:	310 Ft.

Hydraulic Information

Segment Width:	5 Ft.
Segment Depth:	0.702 Ft.
Segment Velocity:	0.451 Ft./Sec.
Segment Flow:	1.257 MGD
Incremental Flow:	0.09 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	No
Bottom Type:	Silt
Sludge:	None
Plants:	Few
Algae:	Only On Edges

modout
"Model Run For U:\Water Permits\VPDES Program\Facility Archive\Basham Simms WQMF
(VA0022802)\Basham Simms 2005 modification\Basham_existing_12_5_6.mod On 1/4/2006 7:35:07 AM"

"Model is for NF GOOSE CREEK."
"Model starts at the BASHAM SIMMS discharge."

"Background Data"
"Flow", "CBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
1.0567, 2, 0, 7.384, 25

"Discharge/Tributary Input Data for Segment 1"
"Flow", "CBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
1, 12, 5, 6, 25

Back to ...
1.0 mgd

"Hydraulic Information for Segment 1"
"Length", "width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
1.62, 3.801, .515, .835

"Initial Mix Values for Segment 1"
"Flow", "DO", "CBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
1.0567, 6.074, 28.659, 8.195, 8.217, 25

"Rate Constants for Segment 1. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
.9, 1.132, 20, 22.518, .2, .294, 0, 0

"Output for Segment 1"
"Segment starts at BASHAM SIMMS"
"Total", "Segm."
"Dist.", "Dist.", "DO", "CBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
0, 0, 6.074, 28.659, 8.195
.1, .1, 6.165, 28.422, 8.177
.2, .2, 6.244, 28.187, 8.159
.3, .3, 6.313, 27.954, 8.141
.4, .4, 6.374, 27.723, 8.124
.5, .5, 6.427, 27.494, 8.107
.6, .6, 6.474, 27.267, 8.09
.7, .7, 6.515, 27.042, 8.073
.8, .8, 6.552, 26.819, 8.056
.9, .9, 6.585, 26.598, 8.039
1, 1, 6.615, 26.378, 8.022
1.1, 1.1, 6.642, 26.16, 8.005
1.2, 1.2, 6.666, 25.944, 7.988
1.3, 1.3, 6.688, 25.73, 7.971
1.4, 1.4, 6.709, 25.518, 7.954
1.5, 1.5, 6.728, 25.307, 7.937
1.6, 1.6, 6.746, 25.098, 7.92
1.62, 1.62, 6.749, 25.056, 7.917

CBOD 25.056 = nCBOD 10.02
nCBOD 7.917 = nCBOD 4.82

Use 7.917 input for other model (seg2 input)

"Discharge/Tributary Input Data for Segment 2"
"Flow", "CBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.2, 2, 0, 7.407, 25

"Incremental Flow Input Data for Segment 2"
"Flow", "CBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.141, 2, 0, 7.414, 25

"Hydraulic Information for Segment 2"
"Length", "width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
4.6, 5, .702, .451

"Initial Mix Values for Segment 2"
"Flow", "DO", "CBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
1.3977, 6.91, 20.163, 5.985, 8.237, 25

"Rate Constants for Segment 2. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
.9, 1.132, 6.522, 7.343, .2, .294, 0, 0

"Output for Segment 2"
"Segment starts at UT"
"Total", "Segm."

"Dist.", "(mi)"	"Dist.", "(mi)"	"DO", "(mg/l)"	"CBOD", "(mg/l)"	"nBOD", "(mg/l)"	modout
1.62,	0,	6.91,	20.163,	5.985	
1.72,	.1,	6.721,	19.856,	5.961	
1.82,	.2,	6.554,	19.554,	5.937	
1.92,	.3,	6.408,	19.256,	5.913	
2.02,	.4,	6.28,	18.963,	5.89	
2.12,	.5,	6.168,	18.674,	5.867	
2.22,	.6,	6.071,	18.39,	5.844	
2.32,	.7,	5.988,	18.11,	5.821	
2.42,	.8,	5.917,	17.834,	5.798	
2.52,	.9,	5.856,	17.562,	5.775	
2.62,	1,	5.805,	17.295,	5.752	
2.72,	1.1,	5.763,	17.032,	5.729	
2.82,	1.2,	5.729,	16.773,	5.706	
2.92,	1.3,	5.702,	16.518,	5.683	
3.02,	1.4,	5.681,	16.266,	5.66	
3.12,	1.5,	5.666,	16.018,	5.638	
3.22,	1.6,	5.656,	15.774,	5.616	
3.32,	1.7,	5.651,	15.534,	5.594	
3.42,	1.8,	5.65,	15.297,	5.572	
3.52,	1.9,	5.652,	15.064,	5.55	
3.62,	2,	5.658,	14.835,	5.528	
3.72,	2.1,	5.666,	14.609,	5.506	
3.82,	2.2,	5.677,	14.387,	5.484	
3.92,	2.3,	5.69,	14.168,	5.462	
4.02,	2.4,	5.705,	13.952,	5.44	
4.12,	2.5,	5.722,	13.74,	5.418	
4.22,	2.6,	5.741,	13.531,	5.396	
4.32,	2.7,	5.761,	13.325,	5.375	
4.42,	2.8,	5.782,	13.122,	5.354	
4.52,	2.9,	5.804,	12.922,	5.333	
4.62,	3,	5.827,	12.725,	5.312	
4.72,	3.1,	5.851,	12.531,	5.291	
4.82,	3.2,	5.875,	12.34,	5.27	
4.92,	3.3,	5.9,	12.152,	5.249	
5.02,	3.4,	5.925,	11.967,	5.228	
5.12,	3.5,	5.951,	11.785,	5.207	
5.22,	3.6,	5.977,	11.606,	5.186	
5.32,	3.7,	6.003,	11.429,	5.165	
5.42,	3.8,	6.029,	11.255,	5.144	
5.52,	3.9,	6.056,	11.084,	5.124	
5.62,	4,	6.083,	10.915,	5.104	
5.72,	4.1,	6.11,	10.749,	5.084	
5.82,	4.2,	6.136,	10.585,	5.064	
5.92,	4.3,	6.162,	10.424,	5.044	
6.02,	4.4,	6.188,	10.265,	5.024	
6.12,	4.5,	6.214,	10.109,	5.004	
6.22,	4.6,	6.24,	9.955,	4.984	

does not a-ct for Round 14.1
See other runs

"END OF FILE"

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to NF GOOSE CREEK.

File Information

File Name: I:\althompson\Permit Documents\PERMITS IN PROGRESS\Basham Simm
Date Modified: January 04, 2006

Model Run #2

Water Quality Standards Information

Stream Name: NF GOOSE CREEK
River Basin: Potomac/Shenandoah Rivers Basin
Section: 9
Class: III - Nontidal Waters (Coastal and Piedmont)
Special Standards: none

Background Flow Information

Gauge Used: Taylorstown
Gauge Drainage Area: 89.6 Sq.Mi.
Gauge 7Q10 Flow: 1.03 MGD
Headwater Drainage Area: 10.84 Sq.Mi.
Headwater 7Q10 Flow: 0 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges: -0.12461 MGD
Incremental Flow in Segments: 1.149554E-02 MGD/Sq.Mi.

Background Water Quality

Background Temperature: 25 Degrees C
Background cBOD5: 2 mg/l
Background TKN: 0 mg/l
Background D.O.: 7.383517 mg/l

Model Segmentation

Number of Segments: 2
Model Start Elevation: 450 ft above MSL
Model End Elevation: 310 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to NF GOOSE CREEK.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	ROUND HILL STP
VPDES Permit No.:	

Discharger Flow Information

Flow:	0.5 MGD
cBOD5:	10 mg/l
TKN:	3 mg/l
D.O.:	7 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	2.95 miles
Upstream Drainage Area:	10.84 Sq.Mi.
Downstream Drainage Area:	17.4 Sq.Mi.
Upstream Elevation:	450 Ft.
Downstream Elevation:	360 Ft.

Hydraulic Information

Segment Width:	12 Ft.
Segment Depth:	0.203 Ft.
Segment Velocity:	0.318 Ft./Sec.
Segment Flow:	0.5 MGD
Incremental Flow:	0.075 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Moderately Meandering
Pool and Riffle:	No
Bottom Type:	Silt
Sludge:	None
Plants:	Few
Algae:	On Entire Bottom

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to NF GOOSE CREEK.

Segment Information for Segment 2

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	UT WITH BASHAM SIMMS
VPDES Permit No.:	

Discharger Flow Information

Flow:	1 MGD
cBOD5:	10 mg/l
TKN:	4.82 mg/l
D.O.:	6.75 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	4.6 miles
Upstream Drainage Area:	17.4 Sq.Mi.
Downstream Drainage Area:	25.34 Sq.Mi.
Upstream Elevation:	360 Ft.
Downstream Elevation:	310 Ft.

Hydraulic Information

Segment Width:	18.999 Ft.
Segment Depth:	0.348 Ft.
Segment Velocity:	0.326 Ft./Sec.
Segment Flow:	1.5 MGD
Incremental Flow:	0.091 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	No
Bottom Type:	Silt
Sludge:	None
Plants:	Few
Algae:	Only On Edges

modout
 "Model Run For I:\althompson\Permit Documents\PERMITS IN PROGRESS\Basham Simms 2005
 modification\Fact Sheet and attachments\Rnd Hill as 2 segments Basham at 1 mgd.mod On 1/4/2006
 7:39:03 AM"

"Model is for NF GOOSE CREEK."
 "Model starts at the ROUND HILL STP discharge."

"Background Data"
 "Flow", "CBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 0, 2, 0, 7.384, 25

"Discharge/Tributary Input Data for Segment 1"
 "Flow", "CBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .5, 10, 3, .7, 25

"Hydraulic Information for Segment 1"
 "Length", "width", "Depth", "Velocity"
 "(mi)", "(ft)", "(ft)", "(ft/sec)"
 2.95, 12, .203, .318

"Initial Mix values for Segment 1"
 "Flow", "DO", "CBOD", "nBOD", "BODSat", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .5, 7, 25, 0, 8.217, 25

"Rate Constants for Segment 1. - (All units Per Day)"
 "k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
 1.4, 1.761, 18.305, 20.61, .35, .514, 0, 0

"Output for Segment 1"
 "Segment starts at ROUND HILL STP"
 "Total", "Segm."
 "Dist.", "Dist.", "DO", "CBOD", "nBOD"
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
 0, 0, 7, 25, 0
 .1, .1, 6.712, 24.168, 0
 .2, .2, 6.541, 23.364, 0
 .3, .3, 6.448, 22.586, 0
 .4, .4, 6.407, 21.834, 0
 .5, .5, 6.4, 21.107, 0
 .6, .6, 6.415, 20.404, 0
 .7, .7, 6.444, 19.725, 0
 .8, .8, 6.482, 19.068, 0
 .9, .9, 6.526, 18.433, 0
 1, 1, 6.573, 17.819, 0
 1.1, 1.1, 6.621, 17.226, 0
 1.2, 1.2, 6.67, 16.653, 0
 1.3, 1.3, 6.719, 16.099, 0
 1.4, 1.4, 6.767, 15.563, 0
 1.5, 1.5, 6.814, 15.045, 0
 1.6, 1.6, 6.86, 14.544, 0
 1.7, 1.7, 6.905, 14.06, 0
 1.8, 1.8, 6.948, 13.592, 0
 1.9, 1.9, 6.99, 13.14, 0
 2, 2, 7.031, 12.703, 0
 2.1, 2.1, 7.07, 12.28, 0
 2.2, 2.2, 7.108, 11.871, 0
 2.3, 2.3, 7.145, 11.476, 0
 2.4, 2.4, 7.181, 11.094, 0
 2.5, 2.5, 7.215, 10.725, 0
 2.6, 2.6, 7.248, 10.368, 0
 2.7, 2.7, 7.28, 10.023, 0
 2.8, 2.8, 7.311, 9.689, 0
 2.9, 2.9, 7.341, 9.367, 0
 2.95, 2.95, 7.356, 9.21, 0

"Discharge/Tributary Input Data for segment 2"
 "Flow", "CBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 1, 10, 4.82, 6.75, 25

"Incremental Flow Input Data for Segment 2"
 "Flow", "CBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .075, 2, 0, 7.414, 25

"Hydraulic Information for Segment 2"
 "Length", "width", "Depth", "Velocity"
 "(mi)", "(ft)", "(ft)", "(ft/sec)"

← Basham Simms effluent
 at bottom of tributary

```

4.6,      18.999,   .348,   .326
modout

"Initial Mix values for Segment 2"
"Flow", "DO", "CBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
1.575, 6.974, 19.035, 5.004, 8.237, 25

"Rate Constants for Segment 2. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
1.2, 1.51, 6.522, 7.343, .4, .588, 0, 0

"Output for Segment 2"
"Segment starts at UT WITH BASHAM SIMMS"
"Total", "Segm.", "DO", "CBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
2.95, 0, 6.974, 19.035, 5.004
3.05, .1, 6.589, 18.504, 4.949
3.15, .2, 6.268, 17.988, 4.895
3.25, .3, 6.002, 17.486, 4.841
3.35, .4, 5.784, 16.998, 4.788
3.45, .5, 5.608, 16.524, 4.736
3.55, .6, 5.467, 16.063, 4.684
3.65, .7, 5.357, 15.615, 4.633
3.75, .8, 5.273, 15.179, 4.582
3.85, .9, 5.212, 14.755, 4.532
3.95, 1, 5.17, 14.343, 4.482
4.05, 1.1, 5.145, 13.943, 4.433
4.15, 1.2, 5.134, 13.554, 4.384
4.25, 1.3, 5.135, 13.176, 4.336
4.35, 1.4, 5.146, 12.808, 4.288
4.45, 1.5, 5.166, 12.451, 4.241
4.55, 1.6, 5.193, 12.104, 4.195
4.65, 1.7, 5.226, 11.766, 4.149
4.75, 1.8, 5.264, 11.438, 4.104
4.85, 1.9, 5.306, 11.119, 4.059
4.95, 2, 5.352, 10.809, 4.015
5.05, 2.1, 5.4, 10.507, 3.971
5.15, 2.2, 5.45, 10.214, 3.927
5.25, 2.3, 5.502, 9.929, 3.884
5.35, 2.4, 5.555, 9.652, 3.841
5.45, 2.5, 5.609, 9.383, 3.799
5.55, 2.6, 5.664, 9.121, 3.757
5.65, 2.7, 5.719, 8.866, 3.716
5.75, 2.8, 5.774, 8.619, 3.675
5.85, 2.9, 5.829, 8.378, 3.635
5.95, 3, 5.883, 8.144, 3.595
6.05, 3.1, 5.937, 7.917, 3.556
6.15, 3.2, 5.99, 7.696, 3.517
6.25, 3.3, 6.042, 7.481, 3.478
6.35, 3.4, 6.094, 7.272, 3.44
6.45, 3.5, 6.145, 7.069, 3.402
6.55, 3.6, 6.195, 6.872, 3.365
6.65, 3.7, 6.244, 6.68, 3.328
6.75, 3.8, 6.292, 6.494, 3.292
6.85, 3.9, 6.339, 6.313, 3.256
6.95, 4, 6.385, 6.137, 3.22
7.05, 4.1, 6.43, 5.966, 3.185
7.15, 4.2, 6.474, 5.8, 3.15
7.25, 4.3, 6.517, 5.638, 3.115
7.35, 4.4, 6.559, 5.481, 3.081
7.45, 4.5, 6.6, 5.328, 3.047
7.55, 4.6, 6.641, 5.179, 3.014

```

"END OF FILE"

Attachment 12

ND 1

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to NF GOOSE CREEK.

File Information

File Name: U:\Water Permits\VPDES Program\Facility Archive\Basham Simms WQMF
Date Modified: December 28, 2005

Water Quality Standards Information

Stream Name: NF GOOSE CREEK
River Basin: Potomac/Shenandoah Rivers Basin
Section: 9
Class: III - Nontidal Waters (Coastal and Piedmont)
Special Standards: none

Background Flow Information

Gauge Used: Taylorstown
Gauge Drainage Area: 89.96 Sq.Mi.
Gauge 7Q10 Flow: 1.02 MGD
Headwater Drainage Area: 5 Sq.Mi.
Headwater 7Q10 Flow: 5.669186E-02 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges: 0 MGD
Incremental Flow in Segments: 1.133837E-02 MGD/Sq.Mi.

Background Water Quality

Background Temperature: 25 Degrees C
Background cBOD5: 2 mg/l
Background TKN: 0 mg/l
Background D.O.: 7.383517 mg/l

Model Segmentation

Number of Segments: 2
Model Start Elevation: 450 ft above MSL
Model End Elevation: 310 ft above MSL

* Use seg 1 data as
input for seg 2

Basham 1.5 MGD
DO 6.5
CBOD 10

Input
DO = 6.317
CBOD = 7.38
TKN = 4.8

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to NF GOOSE CREEK.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	BASHAM SIMMS
VPDES Permit No.:	

Discharger Flow Information

Flow:	1.5 MGD
cBOD5:	10 mg/l
TKN:	5 mg/l
D.O.:	6.5 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	1.62 miles
Upstream Drainage Area:	5 Sq.Mi.
Downstream Drainage Area:	17.41 Sq.Mi.
Upstream Elevation:	450 Ft.
Downstream Elevation:	360 Ft.

Hydraulic Information

Segment Width:	4.001 Ft.
Segment Depth:	0.506 Ft.
Segment Velocity:	1.19 Ft./Sec.
Segment Flow:	1.557 MGD
Incremental Flow:	0.141 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	No
Bottom Type:	Silt
Sludge:	None
Plants:	Few
Algae:	Only On Edges

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to NF GOOSE CREEK.

Segment Information for Segment 2

Definition Information

Segment Definition: A tributary enters.
Tributary Name: UT

Tributary Flow Information

Flow: 0.2 MGD
cBOD5: 2 mg/l
TKN: 0 mg/l
D.O.: 7.407 mg/l
Temperature: 25 Degrees C

Geographic Information

Segment Length: 4.6 miles
Upstream Drainage Area: 17.41 Sq.Mi.
Downstream Drainage Area: 25.34 Sq.Mi.
Upstream Elevation: 360 Ft.
Downstream Elevation: 310 Ft.

Hydraulic Information

Segment Width: 5 Ft.
Segment Depth: 0.665 Ft.
Segment Velocity: 0.627 Ft./Sec.
Segment Flow: 1.757 MGD
Incremental Flow: 0.09 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular
Character: Mostly Straight
Pool and Riffle: No
Bottom Type: Silt
Sludge: None
Plants: Few
Algae: Only On Edges

modout
 "Model Run For U:\Water Permits\VPDES Program\Facility Archive\Basham Simms WQMF
 (VA0022802)\Basham Simms 2005 modification\Basham_expand_10_5_65.mod On 12/28/2005 2:00:08 PM"

"Model is for NF GOOSE CREEK."
 "Model starts at the BASHAM SIMMS discharge."

"Background Data"
 "Flow", "CBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .0567, 2, 0, 7.384, 25

"Discharge/Tributary Input Data for Segment 1"
 "Flow", "CBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 1.5, 10, 5, 6.5, 25

"Hydraulic Information for Segment 1"
 "Length", "width", "Depth", "Velocity"
 "(mi)", "(ft)", "(ft)", "(ft/sec)"
 1.62, 4.001, .506, 1.19

"Initial Mix Values for Segment 1"
 "Flow", "DO", "CBOD", "nBOD", "DOSat", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 1.5567, 6.532, 24.272, 8.345, 8.217, 25

"Rate Constants for Segment 1. - (All units Per Day)"
 "k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
 1.4, 1.761, 20, 22.518, .4, .588, 0, 0

"Output for Segment 1"
 "Segment starts at BASHAM SIMMS"
 "Total", "Segm."
 "Dist.", "Dist.", "DO", "CBOD", "nBOD"
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
 0, 0, 6.532, 24.272, 8.345
 .1, .1, 6.486, 24.053, 8.32
 .2, .2, 6.447, 23.836, 8.295
 .3, .3, 6.414, 23.621, 8.27
 .4, .4, 6.387, 23.408, 8.245
 .5, .5, 6.364, 23.197, 8.22
 .6, .6, 6.346, 22.988, 8.195
 .7, .7, 6.332, 22.781, 8.17
 .8, .8, 6.321, 22.576, 8.145
 .9, .9, 6.313, 22.373, 8.12
 1, 1, 6.308, 22.172, 8.096
 1.1, 1.1, 6.305, 21.972, 8.072
 1.2, 1.2, 6.304, 21.774, 8.048
 1.3, 1.3, 6.305, 21.578, 8.024
 1.4, 1.4, 6.307, 21.384, 8
 1.5, 1.5, 6.311, 21.191, 7.976
 1.6, 1.6, 6.316, 21, 7.952
 1.62, 1.62, 6.317, 20.962, 7.947

"Discharge/Tributary Input Data for Segment 2"
 "Flow", "CBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .2, 2, 0, 7.407, 25

"Incremental Flow Input Data for Segment 2"
 "Flow", "CBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .141, 2, 0, 7.414, 25

"Hydraulic Information for Segment 2"
 "Length", "width", "Depth", "Velocity"
 "(mi)", "(ft)", "(ft)", "(ft/sec)"
 4.6, 5, .665, .627

"Initial Mix Values for Segment 2"
 "Flow", "DO", "CBOD", "nBOD", "DOSat", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 1.8977, 6.513, 18.094, 6.519, 8.237, 25

"Rate Constants for Segment 2. - (All units Per Day)"
 "k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
 .7, .881, 6.522, 7.343, .2, .294, 0, 0

"Output for segment 2"
 "Segment starts at UT"
 "Total", "Segm."

"Dist.", "(mi)"	"Dist.", "(mi)"	"DO", "(mg/l)"	"cBOD", "(mg/l)"	"nBOD", "(mg/l)"	modout
1.62,	0,	6.513,	18.094,	6.519	
1.72,	.1,	6.465,	17.939,	6.5	
1.82,	.2,	6.422,	17.786,	6.481	
1.92,	.3,	6.383,	17.634,	6.462	
2.02,	.4,	6.348,	17.483,	6.444	
2.12,	.5,	6.317,	17.334,	6.426	
2.22,	.6,	6.289,	17.186,	6.408	
2.32,	.7,	6.264,	17.039,	6.39	
2.42,	.8,	6.242,	16.893,	6.372	
2.52,	.9,	6.223,	16.749,	6.354	
2.62,	1,	6.206,	16.606,	6.336	
2.72,	1.1,	6.192,	16.464,	6.318	
2.82,	1.2,	6.18,	16.323,	6.3	
2.92,	1.3,	6.17,	16.183,	6.282	
3.02,	1.4,	6.162,	16.045,	6.264	
3.12,	1.5,	6.156,	15.908,	6.246	
3.22,	1.6,	6.151,	15.772,	6.228	
3.32,	1.7,	6.148,	15.637,	6.21	
3.42,	1.8,	6.146,	15.503,	6.192	
3.52,	1.9,	6.145,	15.37,	6.174	
3.62,	2,	6.146,	15.239,	6.156	
3.72,	2.1,	6.148,	15.109,	6.138	
3.82,	2.2,	6.151,	14.98,	6.12	
3.92,	2.3,	6.155,	14.852,	6.102	
4.02,	2.4,	6.159,	14.725,	6.085	
4.12,	2.5,	6.164,	14.599,	6.068	
4.22,	2.6,	6.17,	14.474,	6.051	
4.32,	2.7,	6.177,	14.35,	6.034	
4.42,	2.8,	6.184,	14.227,	6.017	
4.52,	2.9,	6.192,	14.105,	6	
4.62,	3,	6.2,	13.984,	5.983	
4.72,	3.1,	6.209,	13.864,	5.966	
4.82,	3.2,	6.218,	13.746,	5.949	
4.92,	3.3,	6.228,	13.629,	5.932	
5.02,	3.4,	6.238,	13.513,	5.915	
5.12,	3.5,	6.248,	13.398,	5.898	
5.22,	3.6,	6.259,	13.283,	5.881	
5.32,	3.7,	6.27,	13.169,	5.864	
5.42,	3.8,	6.281,	13.056,	5.847	
5.52,	3.9,	6.292,	12.944,	5.83	
5.62,	4,	6.304,	12.833,	5.813	
5.72,	4.1,	6.316,	12.723,	5.796	
5.82,	4.2,	6.328,	12.614,	5.779	
5.92,	4.3,	6.34,	12.506,	5.762	
6.02,	4.4,	6.352,	12.399,	5.746	
6.12,	4.5,	6.364,	12.293,	5.73	
6.22,	4.6,	6.376,	12.188,	5.714	

"END OF FILE"

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to NF GOOSE CREEK.

File Information

File Name: I:\althompson\Permit Documents\PERMITS IN PROGRESS\Basham Simr
Date Modified: December 30, 2005

Water Quality Standards Information

Stream Name: NF GOOSE CREEK
River Basin: Potomac/Shenandoah Rivers Basin
Section: 9
Class: III - Nontidal Waters (Coastal and Piedmont)
Special Standards: none

Background Flow Information

Gauge Used: Taylorstown
Gauge Drainage Area: 89.6 Sq.Mi.
Gauge 7Q10 Flow: 1.03 MGD
Headwater Drainage Area: 10.84 Sq.Mi.
Headwater 7Q10 Flow: 0 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges: -0.12461 MGD
Incremental Flow in Segments: 1.149554E-02 MGD/Sq.Mi.

Background Water Quality

Background Temperature: 25 Degrees C
Background cBOD5: 2 mg/l
Background TKN: 0 mg/l
Background D.O.: 7.383517 mg/l

Model Segmentation

Number of Segments: 2
Model Start Elevation: 450 ft above MSL
Model End Elevation: 310 ft above MSL

2 segments
1.5
DO=6.5

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to NF GOOSE CREEK.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	ROUND HILL STP
VPDES Permit No.:	

Discharger Flow Information

Flow:	0.5 MGD
cBOD5:	10 mg/l
TKN:	3 mg/l
D.O.:	7 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	2.95 miles
Upstream Drainage Area:	10.84 Sq.Mi.
Downstream Drainage Area:	17.4 Sq.Mi.
Upstream Elevation:	450 Ft.
Downstream Elevation:	360 Ft.

Hydraulic Information

Segment Width:	12 Ft.
Segment Depth:	0.17 Ft.
Segment Velocity:	0.379 Ft./Sec.
Segment Flow:	0.5 MGD
Incremental Flow:	0.075 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Moderately Meandering
Pool and Riffle:	No
Bottom Type:	Silt
Sludge:	None
Plants:	Few
Algae:	On Entire Bottom

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to NF GOOSE CREEK.

Segment Information for Segment 2

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	UT WITH BASHAM SIMMS
VPDES Permit No.:	

Discharger Flow Information

Flow:	1.5 MGD
cBOD5:	8.38 mg/l
TKN:	4.82 mg/l
D.O.:	6.317 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	4.6 miles
Upstream Drainage Area:	17.4 Sq.Mi.
Downstream Drainage Area:	25.34 Sq.Mi.
Upstream Elevation:	360 Ft.
Downstream Elevation:	310 Ft.

Hydraulic Information

Segment Width:	20 Ft.
Segment Depth:	0.328 Ft.
Segment Velocity:	0.448 Ft./Sec.
Segment Flow:	2 MGD
Incremental Flow:	0.091 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	No
Bottom Type:	Silt
Sludge:	None
Plants:	Few
Algae:	Only On Edges

modout.txt

"Model Run For I:\althompson\Permit Documents\PERMITS IN PROGRESS\Basham Simms 2005
modification\Fact Sheet and attachments\Rnd Hill as 2 segments.mod On 12/30/2005
8:09:37 AM"

"Model is for NF GOOSE CREEK."
"Model starts at the ROUND HILL STP discharge."

"Background Data"
"7Q10", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
0, 2, 0, 7.384, 25

"Discharge/Tributary Input Data for Segment 1"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.5, 10, 3, .7, 25

"Hydraulic Information for Segment 1"
"Length", "width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
2.95, 12, .17, .379

"Initial Mix Values for Segment 1"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.5, 7, 25, 0, 8.217, 25

"Rate Constants for Segment 1. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
1.4, 1.761, 18.305, 20.61, .35, .514, 0, 0

"Output for Segment 1"
"Segment starts at ROUND HILL STP"
"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
0, 0, 7, 25, 0
.1, .1, 6.749, 24.3, 0
.2, .2, 6.586, 23.62, 0
.3, .3, 6.485, 22.959, 0
.4, .4, 6.428, 22.316, 0
.5, .5, 6.403, 21.691, 0
.6, .6, 6.4, 21.084, 0
.7, .7, 6.412, 20.494, 0
.8, .8, 6.434, 19.92, 0
.9, .9, 6.464, 19.362, 0
1, 1, 6.499, 18.82, 0
1.1, 1.1, 6.537, 18.293, 0
1.2, 1.2, 6.577, 17.781, 0
1.3, 1.3, 6.617, 17.283, 0
1.4, 1.4, 6.658, 16.799, 0
1.5, 1.5, 6.699, 16.329, 0
1.6, 1.6, 6.739, 15.872, 0
1.7, 1.7, 6.779, 15.428, 0
1.8, 1.8, 6.818, 14.996, 0
1.9, 1.9, 6.857, 14.576, 0
2, 2, 6.895, 14.168, 0
2.1, 2.1, 6.932, 13.771, 0
2.2, 2.2, 6.968, 13.385, 0
2.3, 2.3, 7.003, 13.01, 0
2.4, 2.4, 7.037, 12.646, 0
2.5, 2.5, 7.07, 12.292, 0
2.6, 2.6, 7.102, 11.948, 0

				modout.txt
2.7,	2.7,	7.133,	11.613,	0
2.8,	2.8,	7.163,	11.288,	0
2.9,	2.9,	7.192,	10.972,	0
2.95,	2.95,	7.206,	10.817,	0

"Discharge/Tributary Input Data for Segment 2"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
1.5,	8.38,	4.82,	6.317,	25

"Incremental Flow Input Data for Segment 2"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.075,	2,	0,	7.414,	25

"Hydraulic Information for Segment 2"

"Length"	"width"	"Depth"	"velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
4.6,	20,	.328,	.448

"Initial Mix values for Segment 2"

"Flow"	"DO"	"CBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
2.075,	6.571,	17.932,	5.697,	8.237,	25

"Rate Constants for Segment 2. - (All units Per Day)"

"k1"	"k1@T"	"k2"	"k2@T"	"kn"	"kn@T"	"BD"	"BD@T"
1.2,	1.51,	6.522,	7.343,	.4,	.588,	0,	0

"Output for Segment 2"

"Segment starts at UT WITH BASHAM SIMMS"

"Total"	"Segm."			
"Dist."	"Dist."	"DO"	"CBOD"	"nBOD"
"(mi)"	"(mi)"	"(mg/l)"	"(mg/l)"	"(mg/l)"
2.95,	0,	6.571,	17.932,	5.697
3.05,	.1,	6.339,	17.566,	5.652
3.15,	.2,	6.136,	17.208,	5.607
3.25,	.3,	5.96,	16.857,	5.562
3.35,	.4,	5.808,	16.513,	5.518
3.45,	.5,	5.677,	16.176,	5.474
3.55,	.6,	5.566,	15.846,	5.43
3.65,	.7,	5.472,	15.523,	5.387
3.75,	.8,	5.394,	15.207,	5.344
3.85,	.9,	5.329,	14.897,	5.301
3.95,	1,	5.277,	14.593,	5.259
4.05,	1.1,	5.236,	14.296,	5.217
4.15,	1.2,	5.205,	14.005,	5.175
4.25,	1.3,	5.183,	13.72,	5.134
4.35,	1.4,	5.169,	13.44,	5.093
4.45,	1.5,	5.162,	13.166,	5.052
4.55,	1.6,	5.161,	12.898,	5.012
4.65,	1.7,	5.166,	12.635,	4.972
4.75,	1.8,	5.176,	12.377,	4.932
4.85,	1.9,	5.19,	12.125,	4.893
4.95,	2,	5.208,	11.878,	4.854
5.05,	2.1,	5.23,	11.636,	4.815
5.15,	2.2,	5.254,	11.399,	4.777
5.25,	2.3,	5.281,	11.167,	4.739
5.35,	2.4,	5.31,	10.939,	4.701
5.45,	2.5,	5.341,	10.716,	4.663

				modout.txt
5.55,	2.6,	5.374,	10.498,	4.626
5.65,	2.7,	5.408,	10.284,	4.589
5.75,	2.8,	5.443,	10.074,	4.552
5.85,	2.9,	5.479,	9.869,	4.516
5.95,	3,	5.516,	9.668,	4.48
6.05,	3.1,	5.554,	9.471,	4.444
6.15,	3.2,	5.592,	9.278,	4.409
6.25,	3.3,	5.631,	9.089,	4.374
6.35,	3.4,	5.67,	8.904,	4.339
6.45,	3.5,	5.709,	8.722,	4.304
6.55,	3.6,	5.748,	8.544,	4.27
6.65,	3.7,	5.787,	8.37,	4.236
6.75,	3.8,	5.826,	8.199,	4.202
6.85,	3.9,	5.865,	8.032,	4.168
6.95,	4,	5.904,	7.868,	4.135
7.05,	4.1,	5.942,	7.708,	4.102
7.15,	4.2,	5.98,	7.551,	4.069
7.25,	4.3,	6.018,	7.397,	4.037
7.35,	4.4,	6.055,	7.246,	4.005
7.45,	4.5,	6.092,	7.098,	3.973
7.55,	4.6,	6.129,	6.953,	3.941

"END OF FILE"

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to NF GOOSE CREEK.

File Information

File Name: I:\althompson\Permit Documents\PERMITS IN PROGRESS\Basham Simr
Date Modified: December 30, 2005

Water Quality Standards Information

Stream Name: NF GOOSE CREEK
River Basin: Potomac/Shenandoah Rivers Basin
Section: 9
Class: III - Nontidal Waters (Coastal and Piedmont)
Special Standards: none

Background Flow Information

Gauge Used: Taylorstown
Gauge Drainage Area: 89.6 Sq.Mi.
Gauge 7Q10 Flow: 1.03 MGD
Headwater Drainage Area: 10.84 Sq.Mi.
Headwater 7Q10 Flow: 0 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges: -0.12461 MGD
Incremental Flow in Segments: 1.149554E-02 MGD/Sq.Mi.

Background Water Quality

Background Temperature: 25 Degrees C
Background cBOD5: 2 mg/l
Background TKN: 0 mg/l
Background D.O.: 7.383517 mg/l

Model Segmentation

Number of Segments: 2
Model Start Elevation: 450 ft above MSL
Model End Elevation: 310 ft above MSL

2 segments

1) Rnd Hill to
... of UT
Remains to be

2) UT to end

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to NF GOOSE CREEK.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	ROUND HILL STP
VPDES Permit No.:	

Discharger Flow Information

Flow:	0.75 MGD
cBOD5:	10 mg/l
TKN:	3 mg/l
D.O.:	7 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	2.95 miles
Upstream Drainage Area:	10.84 Sq.Mi.
Downstream Drainage Area:	17.4 Sq.Mi.
Upstream Elevation:	450 Ft.
Downstream Elevation:	360 Ft.

Hydraulic Information

Segment Width:	13.999 Ft.
Segment Depth:	0.236 Ft.
Segment Velocity:	0.351 Ft./Sec.
Segment Flow:	0.75 MGD
Incremental Flow:	0.075 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Moderately Meandering
Pool and Riffle:	No
Bottom Type:	Silt
Sludge:	None
Plants:	Few
Algae:	On Entire Bottom

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to NF GOOSE CREEK.

Segment Information for Segment 2

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	UT WITH BASHAM SIMMS
VPDES Permit No.:	

Discharger Flow Information

Flow:	1.5 MGD
cBOD5:	8.38 mg/l
TKN:	4.82 mg/l
D.O.:	6.317 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	4.6 miles
Upstream Drainage Area:	17.4 Sq.Mi.
Downstream Drainage Area:	25.34 Sq.Mi.
Upstream Elevation:	360 Ft.
Downstream Elevation:	310 Ft.

Hydraulic Information

Segment Width:	20 Ft.
Segment Depth:	0.428 Ft.
Segment Velocity:	0.372 Ft./Sec.
Segment Flow:	2.25 MGD
Incremental Flow:	0.091 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	No
Bottom Type:	Silt
Sludge:	None
Plants:	Few
Algae:	Only On Edges

"Model Run For I:\althompson\Permit Documents\PERMITS IN PROGRESS\Basham Simms 2005
modification\Fact Sheet and attachments\Rnd Hill 750000 as 2 segments.mod On
12/30/2005 8:17:50 AM"

"Model is for NF GOOSE CREEK."

"Model starts at the ROUND HILL STP discharge."

"Background Data"

"7Q10"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
0,	2,	0,	7.384,	25

"Discharge/Tributary Input Data for Segment 1"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.75,	10,	3,	.7,	25

"Hydraulic Information for Segment 1"

"Length"	"width"	"Depth"	"velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
2.95,	13.999,	.236,	.351

"Initial Mix Values for Segment 1"

"Flow"	"DO"	"CBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.75,	7,	25,	0,	8.217,	25

"Rate Constants for Segment 1. - (All units Per Day)"

"k1"	"k1@T"	"k2"	"k2@T"	"kn"	"kn@T"	"BD"	"BD@T"
1.4,	1.761,	18.305,	20.61,	.35,	.514,	0,	0

"Output for Segment 1"

"Segment starts at ROUND HILL STP"

"Total"	"Segm."	"DO"	"CBOD"	"nBOD"
"Dist."	"Dist."	"(mg/l)"	"(mg/l)"	"(mg/l)"
"(mi)"	"(mi)"			
0,	0,	7,	25,	0
.1,	.1,	6.733,	24.245,	0
.2,	.2,	6.566,	23.513,	0
.3,	.3,	6.468,	22.803,	0
.4,	.4,	6.417,	22.114,	0
.5,	.5,	6.399,	21.446,	0
.6,	.6,	6.403,	20.798,	0
.7,	.7,	6.423,	20.17,	0
.8,	.8,	6.453,	19.561,	0
.9,	.9,	6.489,	18.97,	0
1,	1,	6.529,	18.397,	0
1.1,	1.1,	6.572,	17.841,	0
1.2,	1.2,	6.616,	17.302,	0
1.3,	1.3,	6.66,	16.779,	0
1.4,	1.4,	6.704,	16.272,	0
1.5,	1.5,	6.748,	15.781,	0
1.6,	1.6,	6.791,	15.304,	0
1.7,	1.7,	6.833,	14.842,	0
1.8,	1.8,	6.874,	14.394,	0
1.9,	1.9,	6.914,	13.959,	0
2,	2,	6.953,	13.537,	0
2.1,	2.1,	6.991,	13.128,	0
2.2,	2.2,	7.028,	12.732,	0
2.3,	2.3,	7.064,	12.347,	0
2.4,	2.4,	7.099,	11.974,	0
2.5,	2.5,	7.133,	11.612,	0
2.6,	2.6,	7.165,	11.261,	0

modout.txt

2.7,	2.7,	7.197,	10.921,	0
2.8,	2.8,	7.228,	10.591,	0
2.9,	2.9,	7.258,	10.271,	0
2.95,	2.95,	7.272,	10.115,	0

"Discharge/Tributary Input Data for Segment 2"
 "Flow", "CBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 1.5, 8.38, 4.82, 6.317, 25

"Incremental Flow Input Data for Segment 2"
 "Flow", "CBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .075, 2, 0, 7.414, 25

"Hydraulic Information for Segment 2"
 "Length", "width", "Depth", "velocity"
 "(mi)", "(ft)", "(ft)", "(ft/sec)"
 4.6, 20, .428, .372

"Initial Mix Values for Segment 2"
 "Flow", "DO", "CBOD", "nBOD", "DOSat", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 2.325, 6.66, 16.94, 5.084, 8.237, 25

"Rate Constants for Segment 2. - (All units Per Day)"
 "k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
 1.2, 1.51, 6.522, 7.343, .4, .588, 0, 0

"Output for Segment 2"
 "Segment starts at UT WITH BASHAM SIMMS"
 "Total", "Segm."
 "Dist.", "Dist.", "DO", "CBOD", "nBOD"
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"

2.95,	0,	6.66,	16.94,	5.084
3.05,	.1,	6.402,	16.525,	5.035
3.15,	.2,	6.184,	16.12,	4.987
3.25,	.3,	6,	15.725,	4.939
3.35,	.4,	5.847,	15.34,	4.892
3.45,	.5,	5.72,	14.964,	4.845
3.55,	.6,	5.617,	14.597,	4.798
3.65,	.7,	5.535,	14.239,	4.752
3.75,	.8,	5.471,	13.89,	4.706
3.85,	.9,	5.422,	13.55,	4.661
3.95,	1,	5.387,	13.218,	4.616
4.05,	1.1,	5.364,	12.894,	4.572
4.15,	1.2,	5.352,	12.578,	4.528
4.25,	1.3,	5.349,	12.27,	4.484
4.35,	1.4,	5.354,	11.969,	4.441
4.45,	1.5,	5.365,	11.676,	4.398
4.55,	1.6,	5.382,	11.39,	4.356
4.65,	1.7,	5.404,	11.111,	4.314
4.75,	1.8,	5.431,	10.839,	4.273
4.85,	1.9,	5.461,	10.573,	4.232
4.95,	2,	5.494,	10.314,	4.191
5.05,	2.1,	5.53,	10.061,	4.151
5.15,	2.2,	5.568,	9.815,	4.111
5.25,	2.3,	5.608,	9.575,	4.071
5.35,	2.4,	5.649,	9.34,	4.032
5.45,	2.5,	5.691,	9.111,	3.993

				modout.txt
5.55,	2.6,	5.734,	8.888,	3.955
5.65,	2.7,	5.778,	8.67,	3.917
5.75,	2.8,	5.822,	8.458,	3.879
5.85,	2.9,	5.866,	8.251,	3.842
5.95,	3,	5.91,	8.049,	3.805
6.05,	3.1,	5.954,	7.852,	3.768
6.15,	3.2,	5.998,	7.66,	3.732
6.25,	3.3,	6.042,	7.472,	3.696
6.35,	3.4,	6.086,	7.289,	3.66
6.45,	3.5,	6.129,	7.11,	3.625
6.55,	3.6,	6.172,	6.936,	3.59
6.65,	3.7,	6.214,	6.766,	3.556
6.75,	3.8,	6.256,	6.6,	3.522
6.85,	3.9,	6.297,	6.438,	3.488
6.95,	4,	6.337,	6.28,	3.454
7.05,	4.1,	6.377,	6.126,	3.421
7.15,	4.2,	6.416,	5.976,	3.388
7.25,	4.3,	6.454,	5.83,	3.355
7.35,	4.4,	6.492,	5.687,	3.323
7.45,	4.5,	6.529,	5.548,	3.291
7.55,	4.6,	6.565,	5.412,	3.259

"END OF FILE"

Attachment 13

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY

Northern Regional Office

13901 Crown Court

Woodbridge, VA 22193

(703) 583-3800

SUBJECT: TOXICS MANAGEMENT PROGRAM (TMP) DATA REVIEW
Town of Purcellville Basham Simms Wastewater Facility (VA0022802)
REVIEWER: Douglas Frasier
DATE: 23 October 2014

PREVIOUS REVIEW: 12 November 2013

DATA REVIEWED:

This review covers the second (2nd) annual chronic toxicity tests conducted in October 2014 at Outfall 001.

DISCUSSION:

The results of these toxicity tests along with the results of previous toxicity tests conducted on the effluent samples collected from Outfall 001 are summarized in Table 1.

The chronic toxicity was determined with a 3-brood chronic static renewal *C. dubia* survival and reproduction test and a 7-day chronic static daily renewal *P. promelas* survival and growth test.

The chronic tests yielded for both species a No Observed Effect Concentration (NOEC) of 100% effluent, exceeding the endpoint of 69%; thus passing the chronic toxicity criteria.

CONCLUSION:

The chronic toxicity tests are valid and the test results acceptable. The test results indicate that the effluent from Outfall 001 exhibits no chronic toxicity to the test species.

BIOMONITORING RESULTS

Basham Simms WWTP (VA0022802)

Table 1
Summary of Toxicity Test Results for Outfall 001

TEST DATE	TEST TYPE/ORGANISM	IC ₂₅	LC ₅₀	NOEC	TU _a	TU _c	% SURV	REMARKS
09/12/02	Acute <i>C. dubia</i>		>100		<1.0		95	1st Quarterly
09/12/02	Acute <i>P. promelas</i>		>100		<1.0		100	
09/24/02	Chronic <i>C. dubia</i>	40.8	>100	100 S 25 R		4	100	
09/24/02	Chronic <i>P. promelas</i>	>100	>100	100 SG		1	98	
12/14/02	Acute <i>C. dubia</i>		>100		<1.0		100	2nd Quarterly
12/12/02	Acute <i>P. promelas</i>		>100		<1.0		95	
12/10/02	Chronic <i>C. dubia</i>	>100	>100	100 SR		1	100	
12/10/02	Chronic <i>P. promelas</i>	>100	>100	100 SG		1	90	
03/20/03	Acute <i>C. dubia</i>		>100		<1.0		100	3rd Quarterly
03/20/03	Acute <i>P. promelas</i>		37.5		2.67		0	
03/18/03	Chronic <i>C. dubia</i>	99.5	>100	100 SR		1	100	
03/18/03	Chronic <i>P. promelas</i>	52.6	75	50 S 25 G		4	0	
07/17/03	Acute <i>C. dubia</i>		>100		<1.0		100	4th Quarterly
07/17/03	Acute <i>P. promelas</i>		>100		<1.0		100	
07/15/03	Chronic <i>C. dubia</i>	>100	>100	100 SR		1	100	
07/15/03	Chronic <i>P. promelas</i>	>100	>100	100 SG		1	100	
10/09/03	Acute <i>P. promelas</i>		>100		<1.0		100	1st Annual
10/07/03	Chronic <i>P. promelas</i>	>100	>100	12.5 S <6.25 G		>16	10	
11/04/03	Chronic <i>P. promelas</i>	>100	>100	100 SG		1	90	Retest
10/07/04	Acute <i>P. promelas</i>		>100		<1.0		100	2nd Annual
10/05/04	Chronic <i>P. promelas</i>	>100	>100	100 SG		1	97.5	
Permit reissued 21 December 2004								
10/19/05	Chronic <i>C. dubia</i>	>100	>100	100 SR		1	100	1 st annual
10/19/05	Chronic <i>P. promelas</i>	>100	>100	100 SG		1	100	
10/03/06	Chronic <i>C. dubia</i>	>100	>100	100 SR		1	100	2 nd annual
10/03/06	Chronic <i>P. promelas</i>	>100	>100	100 SG		1	100	
10/16/07	Chronic <i>C. dubia</i>	>100	>100	100 SR		1	100	3 rd annual
10/16/07	Chronic <i>P. promelas</i>	>100	>100	97.5 S 100 G		1	100	
10/07/08	Chronic <i>C. dubia</i>	>100	>100	100 SR		1	100	4 th annual
10/07/08	Chronic <i>P. promelas</i>	>100	>100	100 SG		1	97.5	
09/29/09	Chronic <i>C. dubia</i>	>100	>100	100 SR		1	100	5 th annual
09/29/09	Chronic <i>P. promelas</i>	>100	>100	100 SG		1	88	

TEST DATE	TEST TYPE/ORGANISM	IC ₂₅	LC ₅₀	NOEC	TU _a	TU _c	% SURV	REMARKS
Permit Reissued 19 February 2010 CTO for the 1.5 MGD facility Issued 16 September 2010								
10/19/10	Chronic <i>C. dubia</i>	>100	>100	100 SR		1	100	1 st Quarter
10/19/10	Chronic <i>P. promelas</i>	>100	>100	100 SG		1	95	
04/05/11	Chronic <i>C. dubia</i>	>100	>100	100 SR		1	100	2 nd Quarter
04/05/11	Chronic <i>P. promelas</i>	>100	>100	100 SG		1	98	
07/06/11	Chronic <i>C. dubia</i>	>100	>100	100 SR		1	100	3 rd Quarter
07/06/11	Chronic <i>P. promelas</i>	>100	>100	100 SG		1	95	
10/04/11	Chronic <i>C. dubia</i>	>100	>100	100 SR		1	100	4 th Quarter
10/04/11	Chronic <i>P. promelas</i>	>100	>100	100 SG		1	98	
03/20/12	Chronic <i>C. dubia</i>	>100	>100	100 SR		1	80	5 th Quarter
03/20/12	Chronic <i>P. promelas</i>	>100	>100	100 SG		1	100	
05/08/12	Chronic <i>C. dubia</i>	>100	>100	100 SR		1	90	6 th Quarter
05/08/12	Chronic <i>P. promelas</i>	>100	>100	100 SG		1	100	
07/10/12	Chronic <i>C. dubia</i>	>100	>100	100 SR		1	100	7 th Quarter
07/10/12	Chronic <i>P. promelas</i>	>100	>100	100 SG		1	100	
10/10/12	Chronic <i>C. dubia</i>	>100	>100	100 SR		1	100	8 th Quarter
10/10/12	Chronic <i>P. promelas</i>	>100	>100	100 SG		1	98	
10/08/13	Chronic <i>C. dubia</i>	>100	>100	100 SR		1	100	1 st annual
10/08/13	Chronic <i>P. promelas</i>	>100	>100	100 SG		1	95	
10/07/14	Chronic <i>C. dubia</i>	>100	>100	100 SR		1	100	2 nd annual
10/07/14	Chronic <i>P. promelas</i>	>100	>100	100 SG		1	100	

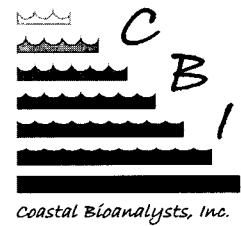
FOOTNOTES:

A **bold** faced LC50 or NOEC indicates that the test fails the toxicity criterion.

ABBREVIATIONS:

S - Survival; R - Reproduction; G - Growth
 % SURV - Percent survival in 100% effluent
 CBI - Coastal Bioanalysts Inc

Client: Purcellville/Basham Simms WWTP
 Project ID: PURC1401
 Client Sample ID: Outfall 001
 Permit No: VA0022802
 Sample Period: 10/6/14 to 10/9/14



Report of Analysis: Whole Effluent Toxicity (WET)

Submitted To: Ms. Susan Davis Town of Purcellville Basham Simms WWTP 1001 20 th Street Purcellville, VA 20132	Prepared By: Coastal Bioanalysts, Inc. 6400 Enterprise Court Gloucester, VA 23061 (804) 694-8285 www.coastalbio.com Contact: Peter F. De Lisle, Technical Director
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Chronic Test Results*										
Species-Test Method	Endpoint	NOEC	LOEC	ChrV	PMSD	T.U. _c	IC25	48-h LC50	LC50 95% C.L.	T.U. _{Ac}
<i>C. dubia</i> EPA 1002.0	Survival	100	>100	>100	N/A	1.00	N/A	>100	N/A	<1.00
	Reproduction	100	>100	>100	11	1.00	>100	N/A	N/A	N/A
<i>P. promelas</i> EPA 1000.0	Survival	100	>100	>100	N/A	1.00	N/A	>100	N/A	<1.00
	Biomass	100	>100	>100	10	1.00	>100	N/A	N/A	N/A


*Note: Details regarding test conduct and data analysis provided in attached bench sheets and printouts as applicable.
 For each test method record the highest endpoint T.U._c value (bold) on the DMR.

Chronic Test QA/QC		Reference Toxicant: KCl		Units: mg/l		Test Organism Source: CBI Stock Cultures			
Species-Method (Ref. Test Date)	Data Source	% Survival		Reproduction (# Young) or Biomass (mg)					RTT in Control?
		Cont.	NOEC	Cont.	NOEC	PMSD	IC25	IC25 A.L.	
C. dubia 1002.0 (9/2/14-9/8/14)	RTT	100	500	25.7	125	12	301	N/A	Yes
	CC	99	500	26.5	250	20	339	265-412	
P. promelas 1000.0 (9/2/14-9/9/14)	RTT	98	500	0.55	500	11	633	N/A	Yes
	CC	99	500	0.61	500	14	624	589-659	

Note: RTT = Reference Toxicant Test, CC = Control Chart, Cont. = Control group.

The results of analysis contained within this report relate only to the sample as received in the laboratory. This report shall not be reproduced except in full without written approval from the laboratory. Unless noted below, these test results meet all requirements of NELAP.

APPROVED:

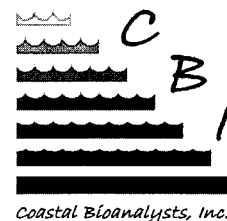

 Peter F. De Lisle, Ph.D.
 Technical Director

10/20/14
 Date

Deviations from, additions to, or exclusions from the test method, non-standard conditions or data qualifiers and, as appropriate, a statement of compliance/non-compliance: **NONE**



Client: Purcellville/Basham Simms WWTP
Project ID: PURC1401
Client Sample ID: Outfall 001
Permit No: VA0022802
Sample Period: 10/6/14 to 10/9/14



GLOSSARY OF TERMS AND ABBREVIATIONS

A.L. (Acceptance Limits): The results of a given reference toxicant test are compared to the control chart mean value ± 2 standard deviations. These limits approximate the 95% probability limits for the "true" reference toxicant value.

Chronic Value (ChrV): The geometric mean of the NOEC and LOEC. Units are same as test concentration units.

C.L. (Confidence Limits): These are the probability limits, based on the data set and statistical model employed, that the "true value" lies within the limits specified. Typically limits are based on 95% or 99% probabilities.

Control chart: A cumulative summary chart of results from QC tests with reference toxicants. The results of a given reference toxicant test are compared to the control chart mean value and 95% Acceptance Limits (A.L.) (mean ± 2 standard deviations).

IC25: The concentration of sample or chemical, calculated from the data set using statistical models, causing a 25% reduction in test organism growth, reproduction, etc. The lower the IC25, the more toxic the chemical or sample. Units are same as test concentration units.

LC50: The concentration of sample or chemical, calculated from the data set using statistical models, causing a 50% reduction in test organism survival. The lower the LC50, the more toxic the chemical or sample. Units are same as test concentration units. Note: The LC50 value must always be associated with the duration of exposure. Thus 48-h LC50, 96-h LC50, etc. are calculated.

LOEC: Lowest-observable-effect-concentration. The lowest concentration of sample or chemical in a chronic test dilution series in which the test organisms exhibit a statistically significant reduction in any of the test end points (e.g. growth, survival, reproduction) compared to control organisms. Units are same as test concentration units.

PMSD: Percent Minimum Significant Difference: The minimum difference which can exist between a test treatment and the controls in a particular test and be statistically significant; a measure of test sensitivity. The lower the PMSD the more sensitive the test.

N/A: Not applicable.

N/D: Not determined or measured.

NOAEC: No-observable-acute-effect-concentration. The highest concentration of sample or chemical in an acute test dilution series in which the test organisms exhibit no statistically significant reduction in the test end point (e.g. survival) compared to control organisms. Units are same as test concentration units.

NOEC: No-observable-effect-concentration. The highest concentration of sample or chemical in a chronic test dilution series in which the test organisms exhibit no statistically significant reduction in any of the test end points (e.g. growth, survival, reproduction) compared to control organisms. Some regulatory definitions also require that the NOEC be less than the LOEC. Units are same as test concentration units.

Q.L.: Quantitation Limit. Level, concentration, or quantity of a target variable (analyte) that can be reported at a specified degree of confidence.

T.U.: Toxic units. Expresses the relative toxicity of an effluent in such a manner that the larger the toxic unit value the more toxic the effluent. $T.U._{Ac} = 100/LC50$. $T.U._{Chr} = 100/NOEC$. A dimensionless unit.



Ceriodaphnia test set up bench sheet (EPA METHOD 1002.0) Template version CCD 5trt 061013

Test chamber:		~30 ml glass vial:	<input checked="" type="checkbox"/>	Illumination & photoperiod:	50-100 ft-c 16L:8D				
		Other:	<input type="checkbox"/>	Number of replicates/treatment:	10				
Test solution volume:		15 ml:	<input checked="" type="checkbox"/>	Initial number animals/replicate:	1				
		Other (ml):	<input type="checkbox"/>	Template #:	4				
<table border="1"> <tr> <td>CHANGES & NOTES (INITIALS, DATE, SPECIFIC CHANGE MADE)</td> <td></td> </tr> </table>								CHANGES & NOTES (INITIALS, DATE, SPECIFIC CHANGE MADE)	
CHANGES & NOTES (INITIALS, DATE, SPECIFIC CHANGE MADE)									

SPECIES:	Ceriodaphnia dubia		
ACCLIMATION WATER:	Mod. Hard Synthetic Freshwater		
FEEDING (Culture & Test):	YCT + Selenastrum capricornutum mix		
SOURCE:	CBI Stock cultures		
ACCLIMATION TEMP (°C):	25		
BROOD RELEASE FROM:	10/6/14 14:15		
BROOD RELEASE TO:	10/6/14 16:30		
DATE/TIME WATER ADDED:	10/7/14 11:51		
DATE/TIME ANIMALS ADDED:	10/7/14 12:10		
ANIMAL AGE WINDOW (TAC 8 h):	2h 14m		
MAX AGE AT TEST START (TAC 24 h):	21h 55m		
TEST SET UP BY:	BJA		
TEST ID:	PURC1401CCD		
PEER REVIEW BY (Initial/Date):	PB	10/15/14 10:2	
PURC1401CCD			

Ceriodaphnia daily water quality bench sheet (EPA METHOD 1002.0) Template version CCD 5irt 061013

TRTMNT	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		SUMMARY WATER QUALITY DATA			
	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	MEAN	S.D.	MIN.	MAX.
pH (S.U.)	7.74	8.20	7.73	8.37	7.67	8.21	7.95	8.33	7.72	8.36	7.79	8.25					8.03	0.28	7.67	8.37
	7.75	8.33	7.75	8.37	7.69	8.27	7.87	8.37	7.77	8.43	7.81	8.28					8.06	0.30	7.69	8.43
	7.76	8.33	7.78	8.41	7.71	8.31	7.87	8.39	7.79	8.40	7.81	8.30					8.07	0.30	7.71	8.41
	7.77	8.32	7.80	8.47	7.73	8.35	7.87	8.38	7.79	8.35	7.81	8.33					8.08	0.30	7.73	8.47
	7.77	8.34	7.81	8.44	7.75	8.36	7.88	8.38	7.81	8.29	7.81	8.33					8.08	0.29	7.75	8.44
	7.78	8.37	7.83	8.46	7.77	8.36	7.88	8.46	7.83	8.45	7.83	8.39					8.12	0.31	7.77	8.46
Temp. (o C)	25	25	25	25	25	25	25	25	25	25	25	25					25	0.0	25	25
	25	25	25	25	25	25	25	25	25	25	25	25					25	0.0	25	25
	25	25	25	25	25	25	25	25	25	25	25	25					25	0.0	25	25
	25	25	25	25	25	25	25	25	25	25	25	25					25	0.0	25	25
	25	25	25	25	25	25	25	25	25	25	25	25					25	0.0	25	25
Diss. Oxygen (mg/l)	8.2	8.6	8.2	8.8	8.2	8.7	8.2	8.9	8.1	8.9	8.2	9.4					8.5	0.4	8.1	9.4
	8.2	8.9	8.1	8.7	8.2	8.8	8.2	9.0	8.0	9.0	8.2	9.3					8.6	0.4	8.0	9.3
	8.2	8.9	8.1	8.9	8.2	9.0	8.2	9.1	8.0	9.4	8.2	9.3					8.6	0.5	8.0	9.4
	8.2	9.0	8.1	9.3	8.2	9.0	8.2	9.0	8.0	9.3	8.2	9.4					8.7	0.5	8.0	9.4
	8.2	9.0	8.1	9.3	8.2	9.1	8.2	9.2	8.0	9.3	8.2	9.5					8.7	0.6	8.0	9.5
	8.2	9.0	8.2	9.4	8.2	9.3	8.2	9.3	8.0	9.6	8.2	9.4					8.8	0.6	8.0	9.6
Cond. (uS/cm)	300		294		298		300		301		305						300	3.6	294	305
	473		464		479		489		489		495						482	11.7	464	495
	512		517		518		519		542		538						524	12.4	512	542
	565		555		566		581		584		585						573	12.4	555	585
	612		606		618		640		635		640						625	15.0	606	640
	673		675		680		704		711		711						692	18.2	673	711
Replicate measured	S	B	S	E	S	F	S	J	S	G	S	A					NOTE: Final D.O. Values >8.3 mg/l (saturation) may occur due to photosynthetic activity of algal food.			
Initials	BUA												GB							
Changes & Notes (Initials, date, specific change or notes)																				
PURC1401CCD																				
											TRT ID:		1	2	3	4	5			
											CONC:		47.0%	57.0%	69.0%	83.0%	100%			

Ceriodaphnia daily reproduction count bench sheet (EPA METHOD 1002.0) Template version CCD 5trt 061013

TRTMNT	Rep	Repro Day 0	Repro Day 1	Repro Day 2	Repro Day 3	Repro Day 4	Repro Day 5	Repro Day 6	Repro Day 7	4th Broods Removed	TOTAL REPRO			
	A	0	0	0	6	12	0	18			36			
C	B	0	0	0	5	14	0	16			35			
	C	0	0	0	5	0	10	14			29			
Lab	D	0	0	0	4	0	10	12			26			
Control	E	0	0	0	3	10	0	14			27			
	F	0	0	0	5	0	8	16			29			
	G	0	0	0	5	12	0	18			35			
	H	0	0	0	4	0	10	12			26			
	I	0	0	0	4	8	0	16			28			
	J	0	0	0	3	12	0	14			29			
	A	0	0	0	5	18	0	16			39			
#1	B	0	0	0	3	16	0	16			35			
	C	0	0	0	5	0	14	14			33			
47.0%	D	0	0	0	3	0	12	16			31			
	E	0	0	0	3	0	12	14			29			
Vol. Effl:	F	0	0	0	5	16	0	16			37			
94 ml	G	0	0	0	5	12	0	16			33	A	10/6/14 7:30	
	H	0	0	0	3	12	0	16			31	B	10/7/14 7:30	
	I	0	0	0	3	12	0	16			31	C	10/9/14 7:30	
	J	0	0	0	4	14	0	14			32	D		
	A	0	0	0	6	12	0	16			34	E		
#2	B	0	0	0	3	14	0	14			31			
	C	0	0	0	6	0	14	16			36			
57.0%	D	0	0	0	5	12	0	18			35			
	E	0	0	0	3	10	0	16			29			
Vol. Effl:	F	0	0	0	5	0	12	18			35	SAMPLE:	A	
114 ml	G	0	0	0	2	12	0	16			30	1st USE DATE/TIME:	10/7/14 12:10	
	H	0	0	0	4	16	0	16			36	LAST USE DATE/TIME:	10/7/14 12:10	
	I	0	0	0	4	16	0	14			34	TIME COLLECT TO 1st USE:	28h 41m	
	J	0	0	0	3	12	0	16			31		(TAC 36 h max)	
	A	0	0	0	4	12	0	16			32	TIME 1st TO LAST USE:	0h 0m	
	B	0	0	0	3	12	0	14			29		(TAC MAX 72 h)	
	C	0	0	0	5	0	10	12			27			
69.0%	D	0	0	0	5	12	0	14			31	SAMPLE:	B	
	E	0	0	0	4	8	0	14			26	1st USE DATE/TIME:	10/8/14 11:58	
Vol. Effl:	F	0	0	0	4	0	12	16			32	LAST USE DATE/TIME:	10/9/14 13:40	
138 ml	G	0	0	0	3	0	10	18			31	TIME COLLECT TO 1st USE:	28h 28m	
	H	0	0	0	6	14	0	16			36		(TAC 36 h max)	
	I	0	0	0	2	12	0	14			28	TIME 1st TO LAST USE:	25h 42m	
	J	0	0	0	3	14	0	14			31		(TAC MAX 72 h)	
	A	0	0	0	5	10	0	16			31			
#4	B	0	0	0	3	12	0	14			29	SAMPLE:	C	
	C	0	0	0	3	0	12	14			29	1st USE DATE/TIME:	10/10/14 13:09	
83.0%	D	0	0	0	6	0	12	12			30	LAST USE DATE/TIME:	10/12/14 14:02	
	E	0	0	0	4	14	0	14			32	TIME COLLECT TO 1st USE:	29h 40m	
Vol. Effl:	F	0	0	0	5	0	12	14			31		(TAC 36 h max)	
166 ml	G	0	0	0	6	0	12	14			32	TIME 1st TO LAST USE:	48h 52m	
	H	0	0	0	3	14	0	14			31		(TAC MAX 72 h)	
	I	0	0	0	2	14	0	16			32			
	J	0	0	0	4	0	12	16			32	SAMPLE:	D	
	A	0	0	0	3	14	0	16			33	1st USE DATE/TIME:		
#5	B	0	0	0	4	14	0	18			36	LAST USE DATE/TIME:		
	C	0	0	0	3	14	0	12			29	TIME COLLECT TO 1st USE:	0	
100%	D	0	0	0	3	14	0	16			33		(TAC 36 h max)	
	E	0	0	0	2	10	0	14			26	TIME 1st TO LAST USE:	0	
Vol. Effl:	F	0	0	0	3	12	0	14			29		(TAC MAX 72 h)	
200 ml	G	0	0	0	4	14	0	12			30	SAMPLE:	E	
	H	0	0	0	5	16	0	16			37	1st USE DATE/TIME:		
	I	0	0	0	2	14	0	16			32	LAST USE DATE/TIME:		
	J	0	0	0	2	0	10	12			24	TIME COLLECT TO 1st USE:	0	
INITIALS:	BJA	RCD	AG	GB	RCD	AG	GB						(TAC 36 h max)	
DATE & TIME:	10/7/14 12:10	10/8/14 11:58	10/9/14 13:40	10/10/14 13:09	10/11/14 13:50	10/12/14 14:02	10/13/14 15:21						TIME 1st TO LAST USE:	0
SAMPLE USED:	A	B	B	C	C	C								(TAC MAX 72 h)
CHANGES & NOTES (INITIALS, DATE, SPECIFIC CHANGE MADE)														
PURC1401CCD	Avg. young/surviving control (TAC 15 min):				30.0	Surv. controls with 3 broods:				10				

Ceriodaphnia daily survival count bench sheet (EPA METHOD 1002.0) Template version CCD 5trt 061013

TRTMNT	Rep	#Live Day 0	#Live Day 1	#Live Day 2	#Live Day 3	#Live Day 4	#Live Day 5	#Live Day 6	#Live FINAL	MALE OR FEMALE	TOTAL REPRO	REPRO/ SURV FEM
	A	1	1	1	1	1	1	1	1	F	36	36
C	B	1	1	1	1	1	1	1	1	F	35	35
	C	1	1	1	1	1	1	1	1	F	29	29
Lab	D	1	1	1	1	1	1	1	1	F	26	26
Control	E	1	1	1	1	1	1	1	1	F	27	27
	F	1	1	1	1	1	1	1	1	F	29	29
	G	1	1	1	1	1	1	1	1	F	35	35
	H	1	1	1	1	1	1	1	1	F	26	26
	I	1	1	1	1	1	1	1	1	F	28	28
	J	1	1	1	1	1	1	1	1	F	29	29
	A	1	1	1	1	1	1	1	1	F	39	
#1	B	1	1	1	1	1	1	1	1	F	35	
	C	1	1	1	1	1	1	1	1	F	33	
47.0%	D	1	1	1	1	1	1	1	1	F	31	
	E	1	1	1	1	1	1	1	1	F	29	
	F	1	1	1	1	1	1	1	1	F	37	
	G	1	1	1	1	1	1	1	1	F	33	
	H	1	1	1	1	1	1	1	1	F	31	
	I	1	1	1	1	1	1	1	1	F	31	
	J	1	1	1	1	1	1	1	1	F	32	
	A	1	1	1	1	1	1	1	1	F	34	
#2	B	1	1	1	1	1	1	1	1	F	31	
	C	1	1	1	1	1	1	1	1	F	36	
57.0%	D	1	1	1	1	1	1	1	1	F	35	
	E	1	1	1	1	1	1	1	1	F	29	
	F	1	1	1	1	1	1	1	1	F	35	
	G	1	1	1	1	1	1	1	1	F	30	
	H	1	1	1	1	1	1	1	1	F	36	
	I	1	1	1	1	1	1	1	1	F	34	
	J	1	1	1	1	1	1	1	1	F	31	
	A	1	1	1	1	1	1	1	1	F	32	
#3	B	1	1	1	1	1	1	1	1	F	29	
	C	1	1	1	1	1	1	1	1	F	27	
69.0%	D	1	1	1	1	1	1	1	1	F	31	
	E	1	1	1	1	1	1	1	1	F	26	
	F	1	1	1	1	1	1	1	1	F	32	
	G	1	1	1	1	1	1	1	1	F	31	
	H	1	1	1	1	1	1	1	1	F	36	
	I	1	1	1	1	1	1	1	1	F	28	
	J	1	1	1	1	1	1	1	1	F	31	
	A	1	1	1	1	1	1	1	1	F	31	
#4	B	1	1	1	1	1	1	1	1	F	29	
	C	1	1	1	1	1	1	1	1	F	29	
83.0%	D	1	1	1	1	1	1	1	1	F	30	
	E	1	1	1	1	1	1	1	1	F	32	
	F	1	1	1	1	1	1	1	1	F	31	
	G	1	1	1	1	1	1	1	1	F	32	
	H	1	1	1	1	1	1	1	1	F	31	
	I	1	1	1	1	1	1	1	1	F	32	
	J	1	1	1	1	1	1	1	1	F	32	
	A	1	1	1	1	1	1	1	1	F	33	
#5	B	1	1	1	1	1	1	1	1	F	36	
	C	1	1	1	1	1	1	1	1	F	29	
100%	D	1	1	1	1	1	1	1	1	F	33	
	E	1	1	1	1	1	1	1	1	F	26	
	F	1	1	1	1	1	1	1	1	F	29	
	G	1	1	1	1	1	1	1	1	F	30	
	H	1	1	1	1	1	1	1	1	F	37	
	I	1	1	1	1	1	1	1	1	F	32	
	J	1	1	1	1	1	1	1	1	F	24	
See Reproduction Sheet for Renewal Information												
See ToxCalc printout for summary survival & reproduction data												
CHANGES & NOTES (INITIALS, DATE, SPECIFIC CHANGE MADE)												
PURC1401CCD	% Control survival (TAC 80% min):				100	% Surviving controls with 3 broods (TAC 60% min):				100		

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: Test ID: PURC1401CD Sample ID:
End Date: Lab ID: CBI Sample Type:
Sample Date: Protocol: EPAF 94-EPA Freshwater Test Species: CD-Ceriodaphnia dubia
Comments: DATA ENTERED BY PB

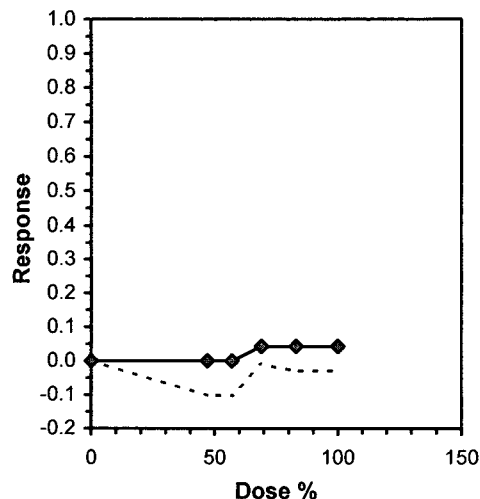
Conc-%	1	2	3	4	5	6	7	8	9	10
CONTROL	36.000	35.000	29.000	26.000	27.000	29.000	35.000	26.000	28.000	29.000
47	39.000	35.000	33.000	31.000	29.000	37.000	33.000	31.000	31.000	32.000
57	34.000	31.000	36.000	35.000	29.000	35.000	30.000	36.000	34.000	31.000
69	32.000	29.000	27.000	31.000	26.000	32.000	31.000	36.000	28.000	31.000
83	31.000	29.000	29.000	30.000	32.000	31.000	32.000	31.000	32.000	32.000
100	33.000	36.000	29.000	33.000	26.000	29.000	30.000	37.000	32.000	24.000

Conc-%	Mean	N-Mean	Transform: Untransformed					t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	N				Mean	N-Mean
CONTROL	30.000	1.0000	30.000	26.000	36.000	12.862	10				32.067	1.0000
47	33.100	1.1033	33.100	29.000	39.000	9.279	10	-2.230	2.287	3.179	32.067	1.0000
57	33.100	1.1033	33.100	29.000	36.000	7.859	10	-2.230	2.287	3.179	32.067	1.0000
69	30.300	1.0100	30.300	26.000	36.000	9.597	10	-0.216	2.287	3.179	30.700	0.9574
83	30.900	1.0300	30.900	29.000	32.000	3.874	10	-0.647	2.287	3.179	30.700	0.9574
100	30.900	1.0300	30.900	24.000	37.000	13.339	10	-0.647	2.287	3.179	30.700	0.9574

Auxiliary Tests					Statistic	Critical	Skew	Kurt						
Kolmogorov D Test indicates normal distribution (p > 0.01)					0.69492	1.035	0.26423	-0.2532						
Bartlett's Test indicates equal variances (p = 0.03)					12.2885	15.0863								
Hypothesis Test (1-tail, 0.05)					NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test					100	>100		1	3.17857	0.10595	18.8967	9.66111	0.10016	5, 54

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL	Skew

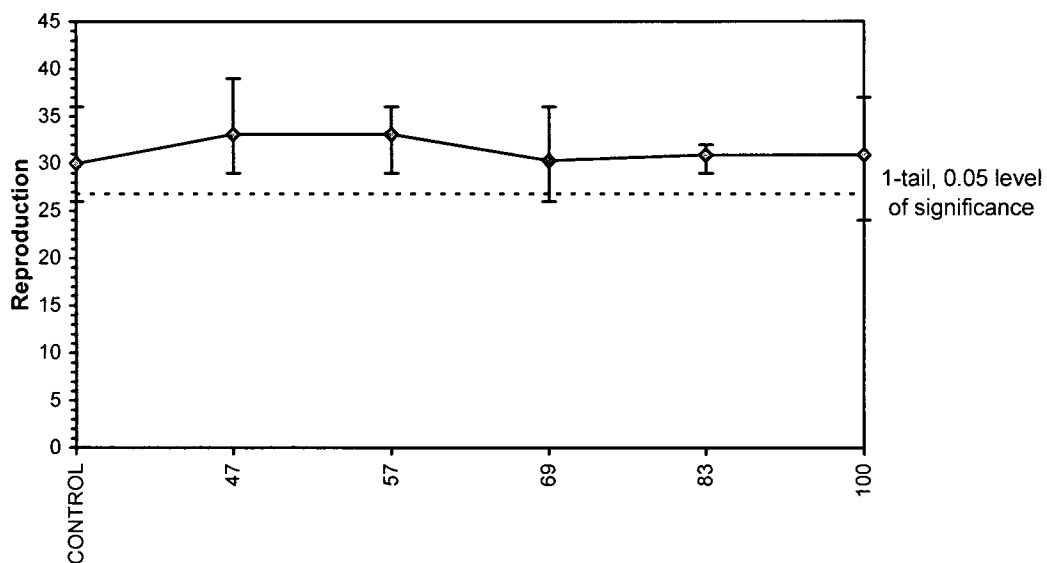
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: Test ID: PURC1401CD Sample ID:
End Date: Lab ID: CBI Sample Type:
Sample Date: Protocol: EPAF 94-EPA Freshwater Test Species: CD-Ceriodaphnia dubia
Comments: DATA ENTERED BY PB

Dose-Response Plot



Fathead minnow test set up bench sheet (EPA METHOD 1000.0) Template version CPP5TRT061013

Test chamber:	1000 ml Poly Beaker	<input checked="" type="checkbox"/>	Illumination & photoperiod:	50-100 ft-c 16L:8D
	Other:		Number of replicates/treatment:	4
Test solution vol. (250 ml min):	500 ml:	<input checked="" type="checkbox"/>	Initial number animals/replicate:	10
	Other (ml):			
CHANGES & NOTES (INITIALS, DATE, SPECIFIC CHANGE MADE)				

SPECIES:	Pimephales promelas
ACCLIMATION WATER:	Mod. Hard Synthetic Freshwater
FEEDING PRIOR TO TEST:	Artemia nauplii (<24 h old) ad libitum
FEEDING DURING TEST:	Artemia nauplii (<24 h old, ~0.15 ml) 2x/day
SOURCE:	CBI Stock cultures
ACCLIMATION TEMP (°C):	25
HATCH START DATE & TIME:	10/6/14 17:00
HATCH END DATE & TIME:	10/7/14 9:30
DATE/TIME WATER ADDED:	10/7/14 11:18
DATE/TIME ANIMALS ADDED:	10/7/14 11:37
ANIMAL AGE WINDOW:	16h 30m
MAX AGE AT TEST START (TAC 24 h MAX):	18h 38m
TEST SET UP BY:	BJA
TEST ID:	PURC1401CPP
PEER REVIEW BY (Initial/Date):	PB. GB 10/15/14 10:35
PURC1401CPP	

Fathead minnow daily water quality bench sheet (EPA METHOD 1000.0) Template version CPP5TRT061013

		Day 0	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	SUMMARY WATER QUALITY DATA				
	TRTMNT	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	MEAN	S.D.	MIN.	MAX.	
pH (S.U.)	C	7.83	7.57	7.73	7.53	7.66	7.42	7.80	7.46	7.73	7.42	7.73	7.47	7.82	7.39	7.61	0.16	7.39	7.83	
	1	7.81	7.58	7.78	7.47	7.69	7.44	7.82	7.55	7.80	7.50	7.77	7.49	7.81	7.36	7.63	0.17	7.36	7.82	
	2	7.81	7.59	7.80	7.47	7.73	7.51	7.84	7.58	7.83	7.48	7.78	7.62	7.81	7.38	7.66	0.16	7.38	7.84	
	3	7.80	7.65	7.80	7.50	7.74	7.56	7.86	7.60	7.83	7.55	7.80	7.60	7.81	7.38	7.68	0.15	7.38	7.86	
	4	7.79	7.65	7.82	7.55	7.76	7.60	7.88	7.62	7.83	7.55	7.82	7.60	7.81	7.43	7.69	0.14	7.43	7.88	
	5	7.77	7.68	7.86	7.62	7.75	7.68	7.88	7.65	7.83	7.55	7.84	7.66	7.81	7.48	7.72	0.12	7.48	7.88	
Temp. (o C)	C	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	0.0	25	25	
	1	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	0.0	25	25	
	2	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	0.0	25	25	
	3	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	0.0	25	25	
	4	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	0.0	25	25	
	5	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	0.0	25	25	
Diss. Oxygen (mg/l)	C	8.2	8.0	8.1	7.6	7.8	7.9	8.0	7.2	8.0	6.7	7.8	7.4	7.8	7.0	7.7	0.4	6.7	8.2	
	1	8.2	7.9	8.1	7.4	7.8	7.9	8.0	7.1	7.9	6.6	7.8	7.3	7.9	7.0	7.6	0.5	6.6	8.2	
	2	8.2	7.9	8.1	6.8	7.8	7.8	8.0	7.1	7.9	6.6	7.9	7.3	7.9	7.0	7.6	0.5	6.6	8.2	
	3	8.2	7.8	8.1	6.8	7.8	7.8	8.0	7.1	7.9	6.5	7.9	7.3	7.9	7.1	7.6	0.5	6.5	8.2	
	4	8.2	7.8	8.1	6.9	7.9	7.8	8.0	7.1	8.0	6.6	8.0	7.2	7.9	7.1	7.6	0.5	6.6	8.2	
	5	8.2	7.6	8.1	6.9	7.9	7.9	8.0	7.1	8.0	6.6	8.0	7.2	8.0	6.6	7.6	0.6	6.6	8.2	
Cond. (uS/cm)	C	300		302		298		298		301		303		303		301	2.1	298	303	
	1	472		475		476		485		484		487		489		481	6.7	472	489	
	2	512		517		520		531		535		535		536		527	10.0	512	536	
	3	553		556		568		576		587		593		593		575	16.8	553	593	
	4	601		612		621		627		643		649		647		629	18.5	601	649	
	5	676		681		686		704		716		717		716		699	18.0	676	717	
Replicate measured		D	B	A	C	B	D	A	B	C	A	D	B	B	C					
Initials		BJA	GB	RCD	AG	AG	GB	GB	RCD	RCD	RCD	AG	GB	AG	GB					
Changes & Notes (Initials, date, specific change or notes)																				
Test Aerated?		No					D.O. Highest conc. @ aeration:					TRT ID:		1	2	3	4	5		
PURC1401CPP		Date & Time Air Start:					Total live highest conc. @ aeration					CONC(%)		47.0%	57.0%	69.0%	83.0%	100%		

Fathead minnow daily biological measurements bench sheet (EPA METHOD 1000.0) Template version CPP5TRT061013

TRT/MNT	Rep	#Live Day 0	#Live Day 1	#Live Day 2	#Live Day 3	#Live Day 4	#Live Day 5	#Live Day 6	#Live Day 7	Total Dry Wt (mg)	Tare Wt (mg)	Wt Count	Pan Number																																																																						
C	A	10	10	10	10	10	10	10	10	15.26	7.71	10	25																																																																						
	B	10	10	10	10	10	10	10	10	13.94	6.76	10	26																																																																						
Lab	C	10	10	10	10	10	10	10	10	18.00	10.95	10	27																																																																						
Control	D	10	10	10	10	10	10	10	10	17.54	10.46	10	28																																																																						
#1	A	10	10	10	10	10	10	10	10	16.96	9.99	10	29																																																																						
47.0%	B	10	10	10	10	10	10	10	10	15.62	9.11	10	30																																																																						
Vol. Effl:	C	10	10	10	10	10	10	10	10	14.73	7.76	10	31																																																																						
752 ml	D	10	10	10	10	10	9	9	9	16.44	9.24	10	32																																																																						
#2	A	10	10	10	10	10	10	10	10	15.97	8.69	10	33																																																																						
57.0%	B	10	10	10	10	10	10	10	10	15.45	8.34	10	34																																																																						
Vol. Effl:	C	10	10	10	10	10	10	10	10	16.84	9.55	10	35																																																																						
912 ml	D	10	10	10	10	10	10	10	10	15.75	8.78	10	36																																																																						
#3	A	10	10	10	10	10	10	10	10	15.20	8.21	10	37																																																																						
69.0%	B	10	10	10	9	9	9	9	9	14.29	7.35	10	38																																																																						
Vol. Effl:	C	10	10	10	10	10	10	10	10	15.34	8.07	10	39																																																																						
1104 ml	D	10	10	10	10	10	10	10	10	14.49	8.49	10	40																																																																						
#4	A	10	10	10	10	10	10	10	10	13.73	7.36	10	41																																																																						
83.0%	B	10	10	10	10	10	10	10	10	15.81	7.97	10	42																																																																						
Vol. Effl:	C	10	10	10	10	10	10	10	10	14.63	7.60	10	43																																																																						
1328 ml	D	10	10	10	10	10	10	10	10	16.46	8.87	10	44																																																																						
#5	A	10	10	10	10	10	10	10	10	16.56	9.45	10	45																																																																						
100%	B	10	10	10	10	10	10	10	10	15.88	9.42	10	46																																																																						
Vol. Effl:	C	10	10	10	10	10	10	10	10	16.39	9.34	10	47																																																																						
1600 ml	D	10	10	10	10	10	10	10	10	16.83	10.18	10	48																																																																						
INITIALS:	BJA												See ToxCalc printout for summary survival & biomass data																																																																						
DATE & TIME:	10/7/14 11:37																																																																																		
SAMPLE USED:	A												Test Duration: 60 23h 59m																																																																						
CHANGES & NOTES (INITIALS, DATE, SPECIFIC CHANGE MADE)																																																																																			
<table border="1"> <thead> <tr> <th colspan="4">MEAN % CONTROL SURVIVAL (TAC 80% MIN):</th> <th colspan="4">AVG. DRY WT. PER SURV. CONTROL (TAC 0.25 mg):</th> <th colspan="2">TIME 1st TO LAST USE (TAC MAX 72 h)</th> </tr> <tr> <th>SAMPLE</th> <th>DATE/TIME</th> <th>1st USE DATE & TIME</th> <th>LAST USE DATE & TIME</th> <th>100</th> <th>100</th> <th>100</th> <th>100</th> <th>0.722</th> <th>0h 0m</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>10/6/14 7:30</td> <td>10/7/14 11:37</td> <td>10/7/14 11:37</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>28h 8m</td> </tr> <tr> <td>B</td> <td>10/7/14 7:30</td> <td>10/8/14 13:03</td> <td>10/9/14 11:44</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>22h 41m</td> </tr> <tr> <td>C</td> <td>10/9/14 7:30</td> <td>10/10/14 13:34</td> <td>10/13/14 11:51</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>70h 17m</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>0</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>0</td> </tr> </tbody> </table>														MEAN % CONTROL SURVIVAL (TAC 80% MIN):				AVG. DRY WT. PER SURV. CONTROL (TAC 0.25 mg):				TIME 1st TO LAST USE (TAC MAX 72 h)		SAMPLE	DATE/TIME	1st USE DATE & TIME	LAST USE DATE & TIME	100	100	100	100	0.722	0h 0m	A	10/6/14 7:30	10/7/14 11:37	10/7/14 11:37						28h 8m	B	10/7/14 7:30	10/8/14 13:03	10/9/14 11:44						22h 41m	C	10/9/14 7:30	10/10/14 13:34	10/13/14 11:51						70h 17m										0										0
MEAN % CONTROL SURVIVAL (TAC 80% MIN):				AVG. DRY WT. PER SURV. CONTROL (TAC 0.25 mg):				TIME 1st TO LAST USE (TAC MAX 72 h)																																																																											
SAMPLE	DATE/TIME	1st USE DATE & TIME	LAST USE DATE & TIME	100	100	100	100	0.722	0h 0m																																																																										
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PURC1401CPP																																																																																			

Larval Fish Growth and Survival Test-7 Day Survival

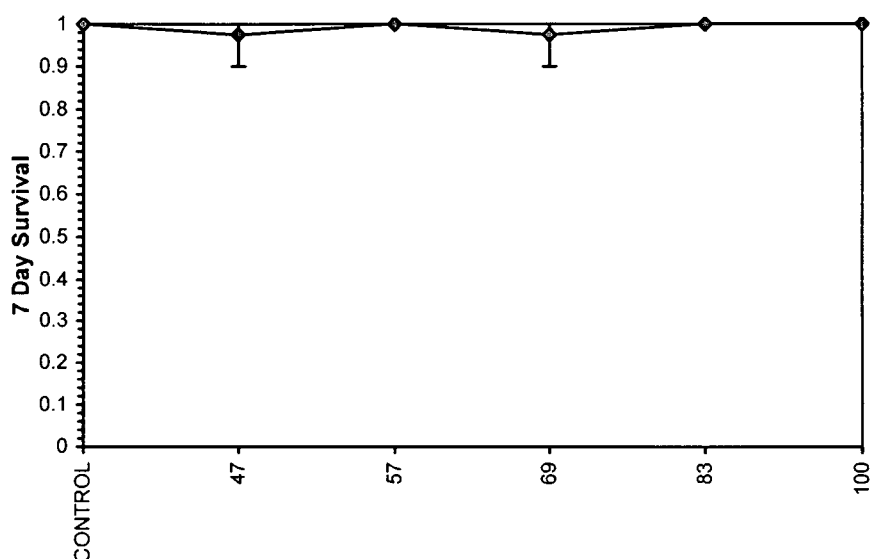
Start Date:	Test ID: PURC1401PP	Sample ID:
End Date:	Lab ID: CBI	Sample Type:
Sample Date:	Protocol: EPAF 94-EPA Freshwater	Test Species: PP-Pimephales promelas
Comments: DATA ENTERED BY PB		

Conc-%	1	2	3	4
CONTROL	1.0000	1.0000	1.0000	1.0000
47	1.0000	1.0000	1.0000	0.9000
57	1.0000	1.0000	1.0000	1.0000
69	1.0000	0.9000	1.0000	1.0000
83	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				N	Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%			
CONTROL	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4		
47	0.9750	0.9750	1.3713	1.2490	1.4120	5.942	4	16.00	10.00
57	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4	18.00	10.00
69	0.9750	0.9750	1.3713	1.2490	1.4120	5.942	4	16.00	10.00
83	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4	18.00	10.00
100	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4	18.00	10.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p \leq 0.01$)	0.61382	0.884	-2.1359	5.27706
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1

Dose-Response Plot



Larval Fish Growth and Survival Test-7 Day Biomass

Start Date:	Test ID: PURC1401PP	Sample ID:
End Date:	Lab ID: CBI	Sample Type:
Sample Date:	Protocol: EPAF 94-EPA Freshwater	Test Species: PP-Pimephales promelas
Comments: DATA ENTERED BY PB		

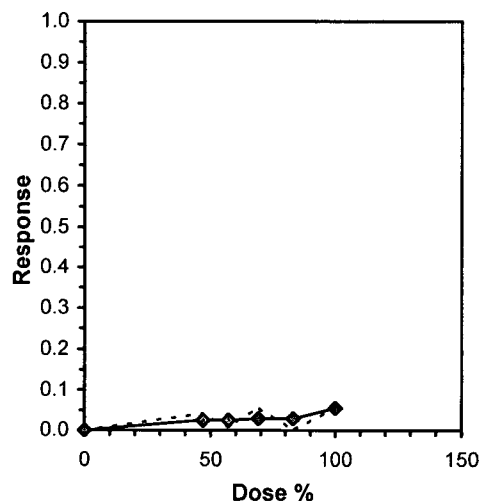
Conc-%	1	2	3	4
CONTROL	0.7550	0.7180	0.7050	0.7080
47	0.6970	0.6510	0.6970	0.7200
57	0.7280	0.7110	0.7290	0.6970
69	0.6990	0.6940	0.7270	0.6000
83	0.6370	0.7840	0.7030	0.7590
100	0.7110	0.6460	0.7050	0.6650

Conc-%	Mean	N-Mean	Transform: Untransformed				N	t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%					Mean	N-Mean
CONTROL	0.7215	1.0000	0.7215	0.7050	0.7550	3.190	4				0.7215	1.0000
47	0.6913	0.9581	0.6913	0.6510	0.7200	4.187	4	1.053	2.410	0.0692	0.7038	0.9754
57	0.7163	0.9927	0.7163	0.6970	0.7290	2.131	4	0.183	2.410	0.0692	0.7038	0.9754
69	0.6800	0.9425	0.6800	0.6000	0.7270	8.129	4	1.445	2.410	0.0692	0.7004	0.9707
83	0.7208	0.9990	0.7208	0.6370	0.7840	9.060	4	0.026	2.410	0.0692	0.7004	0.9707
100	0.6818	0.9449	0.6818	0.6460	0.7110	4.603	4	1.384	2.410	0.0692	0.6818	0.9449

Auxiliary Tests					Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)					0.95177	0.884	-0.7246	0.66006						
Bartlett's Test indicates equal variances (p = 0.20)					7.23779	15.0863								
Hypothesis Test (1-tail, 0.05)					NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test					100	>100		1	0.06924	0.09596	0.00156	0.00165	0.47766	5, 18

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew

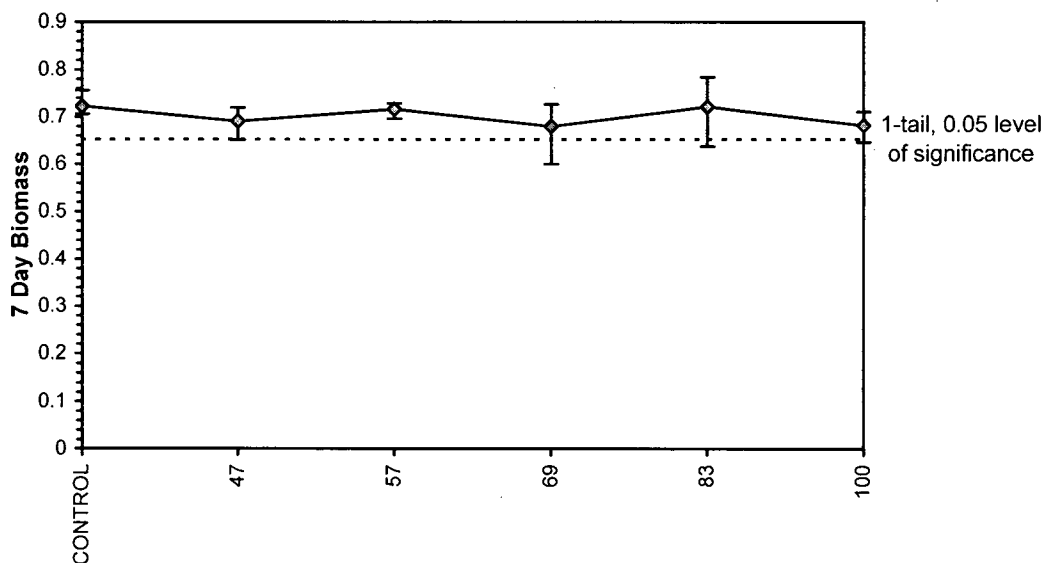
IC05	96.646			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



Larval Fish Growth and Survival Test-7 Day Biomass

Start Date: Test ID: PURC1401PP Sample ID:
End Date: Lab ID: CBI Sample Type:
Sample Date: Protocol: EPAF 94-EPA Freshwater Test Species: PP-Pimephales promelas
Comments: DATA ENTERED BY PB

Dose-Response Plot



Effluent and Dilution Water Log (Freshwater Tests). FWEFFL061013

Effluent and Dilution Water Log (Freshwater Tests). FWEFFL061013										SUMMARY WATER QUALITY DATA					
Initial sample characterization	Bottle(1):	A1	B1	C1							MEAN	S.D.	MIN.	MAX.	PARAMETER
	Arrival Temp. (oC, from CoC):	1	2	1							1	0.6	1	2	Arrival Temp.
	TRC (mg/l)(2):	<DL	<DL	<DL											
	TRC Corrected(2):														
	Hardness (mg/l):	158	156	144							153	7.6	144	158	Hardness (mg/l)
	Alkalinity (mg/l):	87	86	95							89	4.9	86	95	Alkalinity (mg/l)
	NH3-N (mg/l):	<1.0	<1.0	<1.0											
	Color/Appearance(3):	C	C	C											
	Obvious odor?	NO	NO	NO											
Date & Time:	10/7/14 9:51	10/8/14 10:25	10/10/14 9:47												
Initials:	GB	RCD	GB												
Sample prep measurements	Test Day:	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7		MEAN	S.D.	MIN.	MAX.	
	Bottle(s):	A1,2	B1-2	B1-2	C1-4	C1-4	C1-4	C1-4							
	Prep. Temp. (oC):	25	25	25	25	25	25	25			25	0.0	25	25	Temp. (oC)
	D.O. (mg/l) After Warming:	9.2	10.0	9.3	9.4	9.9	9.5	9.5							
	Aeration Time (min):	2	4	2	2	3	4	4							
	Adjusted D.O. (mg/l):	8.2	8.2	8.2	8.2	8.2	8.2	8.2			8.2	0.0	8.2	8.2	D.O. (mg/l)
	Final pH (S.U.):	7.77	7.85	7.74	7.90	7.91	7.86	7.85			7.84	0.06	7.74	7.91	pH (S.U.)
	Conductivity (uS/cm)(4):	669	667	NA	704	NA	NA	NA			680	20.8	667	704	Cond. (uS/cm)
	Final TRC (mg/l)(5):	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.							
	Sample Filtered (60 um)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							
Date & Time:	10/7/14 11:03	10/8/14 11:37	10/9/14 11:20	10/10/14 12:38	10/11/14 13:02	10/12/14 13:35	10/13/14 11:38								
Initials:	BJA	RCD	AG	GB	RCD	AG	AG								
Dilution water	Test Day:	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7		MEAN	S.D.	MIN.	MAX.	
	Vat Number:	3	1	2	2	2	3	3							
	Temperature (oC):	25	25	25	25	25	25	25			25	0.0	25	25	Temp. (oC)
	Conductivity (uS/cm):	299	299	301	295	297	300	304			299	2.9	295	304	Cond. (uS/cm)
	D.O. (mg/l):	8.2	8.2	8.2	8.2	8.2	8.2	8.2			8.2	0.0	8.2	8.2	D.O. (mg/l)
	pH (S.U.):	7.79	7.72	7.72	7.77	7.87	7.89	7.95			7.82	0.09	7.72	7.95	pH (S.U.)
	Hardness (mg/l):	100	98	88	88	88	96	96			93	5.3	88	100	Hardness (mg/l)
	Alkalinity (mg/l):	62	64	62	62	62	64	64			63	1.1	62	64	Alkalinity (mg/l)
Date & Time:	10/7/14 8:15	10/8/14 8:15	10/9/14 8:30	10/10/14 8:35	10/11/14 8:55	10/12/14 8:35	10/13/14 8:40								
Initials:	GB	GB	AG	GB	RCD	RCD	GB								
Changes & Notes (Initials, date, specific change or notes)															
Peer review Initial/Date:	AG. PB	10/13/14 11:40	DILUTION WATER TYPE:	Mod. Hard Synthetic Freshwater (EPA)	ND=Not Determined/Measured, NA=Not Applicable. 1) Ninth character of lab sample ID on chain of custody AND bottle number in collection series. Together with Project ID constitutes entire sample bottle ID. 2) TRC MDL 0.02 mg/l; QL 0.22 mg/l. Corrected value if Mn, Cr potential positive interference. Corrected using KI and NaAsO2. 3) C-clear, O-opaque, T-turbid, S-solids (Sl-slight, M-moderate, H-heavy), Y-yellow, B-brown, Bl-black, G-green, P-pink, Gr-grey, Or-orange. 4) Measured on first use of sample only. 5) Final TRC measured only if chlorine present in initial characterization.										
PROJECT ID:	PURC1401	ADDITIONAL EFFLUENT TREATMENT:													



6400 Enterprise Court, Gloucester, VA 23061
PH: 804-694-8285, FAX: 804-695-1129
www.coastalbio.com

SAMPLE INFORMATION/CHAIN-OF-CUSTODY (FORM ETF2011I Rev. 8/7/13)

Lab Sample ID
(Lab Use Only)

P	U	R	C	I	4	0	1	A
A	A	A	A	Y	Y	N	N	A

Project ID

CBI
Login # 14-0842

FACILITY INFORMATION

CLIENT/FACILITY NAME <u>Town of Purcellville</u> <u>Basham Simms WWTP</u>		CONTACT & PHONE # <u>Scott House 540-338-4945</u>	
NPDES PERMIT NO <u>VA0022802</u>		OUTFALL # OR LOCATION <u>001</u>	
SAMPLE CHLORINATED? <u>N/A</u>	SAMPLE DECHLORINATED? <u>N/A</u>	IF CHLORINE PRESENT UPON ARRIVAL AT LAB, DOES PERMIT SPECIFY DECHLORINATION OF SAMPLES? <u>NO</u>	
TESTS REQUESTED:	SPECIES OR EPA METH # <u>C. dubia</u>	ACUTE <input type="checkbox"/>	CHRONIC <input checked="" type="checkbox"/>
	SPECIES OR EPA METH # <u>P. promelas</u>	ACUTE <input type="checkbox"/>	CHRONIC <input checked="" type="checkbox"/>
OTHER TESTS:			

A SPECIFIC DILUTION SERIES MAY BE REQUIRED IN THE PERMIT. A DEFAULT SERIES OF 100, 50, 25, 12.5 AND 6.3%, OR CONCENTRATIONS USED IN PRIOR TESTING, WILL BE USED UNLESS INDICATED OTHERWISE. IF IN DOUBT PLEASE ATTACH A COPY OF APPLICABLE PERMIT PAGES.

GRAB SAMPLE INFORMATION

SAMPLE DATE <u>10-6-14</u>	SAMPLE TIME <u>7:35</u>	SAMPLE VOLUME <u>1 liter</u>
----------------------------	-------------------------	------------------------------

COMPOSITE SAMPLE INFORMATION

SAMPLE START DATE & TIME <u>10-5-14 7:30am</u>	SAMPLE END DATE & TIME <u>10-6-14 7:30am</u>	AUTOSAMPLER TEMP. (°C) <u>2°C</u>
TIME OR FLOW PROPORTIONAL COMPOSITE INFORMATION	NUMBER SUBSAMPLES <u>48</u>	VOL (ml) SUBSAMPLES <u>200 ml</u>
	SET VOLUME SUBSAMPLE	SET VOLUME FLOW
		TOTAL VOLUME

FOR VARIABLE VOLUME SUBSAMPLES BASED ON FLOW (COMPOSITING "BY HAND") ATTACH SAMPLE AND FLOW INFORMATION ON SEPARATE SHEET

FIELD MEASUREMENTS

DISCHARGE TEMP (°C)	DISCHARGE pH (S.U.)	SAMPLE TEMP (°C)	SAMPLE pH (S.U.)	SAMPLE TRC (mg/l)	DATE/TIME (e.g. 02/23/00 1835)	INITIALS
<u>22°C</u>	<u>7.6</u>	<u>22°C</u>	<u>7.6</u>	<u>N/A</u>	<u>10/6/14 7:42</u>	<u>JC</u>

MEASUREMENTS MUST BE TAKEN WITHIN 15 MINUTES OF SAMPLE OR LAST SUBSAMPLE COLLECTION.

COMMENTS:

JASON CHAPMAN (PRINTED NAME/AFFILIATION SAMPLER/ANALYST) Jason Chapman (SIGNATURE) 10-6-14 (DATE)

RELINQUISHED BY <u>Ausanne Davis</u>	DATE <u>10-6-14</u>	TIME <u>3:15</u>	RECEIVED BY
	<u>10/2/14</u>	<u>0930</u>	<u>A. Davis</u>

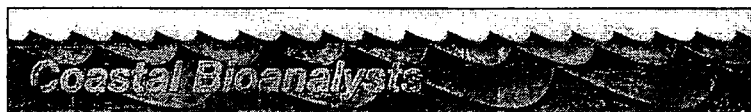
SHIPPING METHOD: UPS _____ FEDEX ☒ HAND DELIVERY _____

DO NOT SHIP FEDEX STANDARD OVERNIGHT
SAMPLES MUST ARRIVE AT LAB BY NOON

CONDITION ON ARRIVAL: ACCEPTABLE ☒ OTHER _____

SAMPLE TEMP: (°C) 1 ARRIVED ON ICE? Y ☒ N _____ CUSTODY SEAL: INTACT ☒ BROKEN _____ ABSENT _____

NOTE: It is the responsibility of the sampler to insure that samples are properly collected, preserved (>0-6°C) and shipped. Sample hold time is 36 h. Additional costs may be incurred by improper preservation, shipping or receipt of samples after 3 p.m. or on weekends and holidays.



6400 Enterprise Court, Gloucester, VA 23061
 PH: 804-694-8285, FAX: 804-695-1129
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SAMPLE INFORMATION/CHAIN-OF-CUSTODY (FORM ETF20111 Rev. 8/7/13)

Lab Sample ID
 (Lab Use Only)

P	U	R	C	I	4	0	1	-	B
A	A	A	A	Y	Y	N	N		A

Project ID

Spl

CBI
 Login # 14-0854

FACILITY INFORMATION

CLIENT/FACILITY NAME <u>Town of Purcellville</u> <u>Basham Simms WWTP</u>		CONTACT & PHONE # <u>Scott House 540-338-4945</u>	
NPDES PERMIT NO <u>VA0022802</u>		OUTFALL # OR LOCATION <u>001</u>	
SAMPLE CHLORINATED? <u>N/A</u>	SAMPLE DECHLORINATED? <u>N/A</u>	IF CHLORINE PRESENT UPON ARRIVAL AT LAB, DOES PERMIT SPECIFY DECHLORINATION OF SAMPLES? <u>NO</u>	
TESTS REQUESTED:	SPECIES OR EPA METH # <u>C. dubia</u>	ACUTE <input type="checkbox"/>	CHRONIC <input checked="" type="checkbox"/>
	SPECIES OR EPA METH # <u>P. promelas</u>	ACUTE <input type="checkbox"/>	CHRONIC <input checked="" type="checkbox"/>
OTHER TESTS:			

A SPECIFIC DILUTION SERIES MAY BE REQUIRED IN THE PERMIT. A DEFAULT SERIES OF 100, 50, 25, 12.5 AND 6.3%, OR CONCENTRATIONS USED IN PRIOR TESTING, WILL BE USED UNLESS INDICATED OTHERWISE. **IF IN DOUBT PLEASE ATTACH A COPY OF APPLICABLE PERMIT PAGES.**

GRAB SAMPLE INFORMATION

SAMPLE DATE <u>10-7-14</u>	SAMPLE TIME <u>7:29 am</u>	SAMPLE VOLUME <u>1 liter</u>
----------------------------	----------------------------	------------------------------

COMPOSITE SAMPLE INFORMATION

SAMPLE START DATE & TIME <u>10-6-14 7:30 am</u>	SAMPLE END DATE & TIME <u>10-7-14 7:30 am</u>	AUTOSAMPLER TEMP. (°C) <u>4°C</u>
TIME OR FLOW PROPORTIONAL COMPOSITE INFORMATION	NUMBER SUBSAMPLES <u>48</u>	VOL (ml) SUBSAMPLES <u>200 ml</u>
	SET VOLUME SUBSAMPLE	SET VOLUME FLOW
		TIME INCREMENT <u>10 min.</u>
		TOTAL VOLUME

FOR VARIABLE VOLUME SUBSAMPLES BASED ON FLOW (COMPOSITING "BY HAND") ATTACH SAMPLE AND FLOW INFORMATION ON SEPARATE SHEET

FIELD MEASUREMENTS

DISCHARGE TEMP (°C)	DISCHARGE pH (S.U.)	SAMPLE TEMP (°C)	SAMPLE pH (S.U.)	SAMPLE TRC (mg/l)	DATE/TIME (e.g. 02/23/00 1835)	INITIALS
<u>22°C</u>	<u>7.7</u>	<u>22°C</u>	<u>7.7</u>	<u>N/A</u>	<u>10/7/14 7:41</u>	<u>JC</u>

MEASUREMENTS MUST BE TAKEN WITHIN 15 MINUTES OF SAMPLE OR LAST SUBSAMPLE COLLECTION.

COMMENTS:

JASON CHAPMAN Jason Chapman 10-7-14
 (PRINTED NAME/AFFILIATION SAMPLER/ANALYST) (SIGNATURE) (DATE)

RELINQUISHED BY	DATE	TIME	RECEIVED BY
<u>Kevin L. Tally</u>	<u>10-7-14</u>	<u>3:00 pm</u>	
	<u>10/8/14</u>	<u>1025</u>	<u>[Signature]</u>

SHIPPING METHOD: UPS _____ FEDEX ☒ HAND DELIVERY _____

DO NOT SHIP FEDEX STANDARD OVERNIGHT.
 SAMPLES MUST ARRIVE AT LAB BY NOON.

CONDITION ON ARRIVAL: ACCEPTABLE ☒ OTHER _____

SAMPLE TEMP: (°C) 2 ARRIVED ON ICE? ☒ Y ☐ N CUSTODY SEAL: INTACT ☒ BROKEN _____ ABSENT _____

NOTE: It is the responsibility of the sampler to insure that samples are properly collected, preserved (>0-6° C) and shipped. Sample hold time is 36 h. Additional costs may be incurred by improper preservation, shipping or receipt of samples after 3 p.m. or on weekends and holidays.



6400 Enterprise Court, Gloucester, VA 23061
PH: 804-694-8285, FAX: 804-695-1129
www.coastalbio.com

Day 3
COOLER 2 OF 2

SAMPLE INFORMATION/CHAIN-OF-CUSTODY (FORM ETF2011I Rev. 8/7/13)

Lab Sample ID
(Lab Use Only)

P	U	R	C	I	4	0	1
A	A	A	A	Y	Y	N	N

Project ID

CBI
Login # 17-0852

FACILITY INFORMATION

CLIENT/FACILITY NAME	Town of Purcellville Basham Simms WWTP	CONTACT & PHONE #	Scott House 540-338-4945
NPDES PERMIT NO	VA0022802	OUTFALL # OR LOCATION	001
SAMPLE CHLORINATED?	N/A	SAMPLE DECHLORINATED?	N/A
IF CHLORINE PRESENT UPON ARRIVAL AT LAB, DOES PERMIT SPECIFY DECHLORINATION OF SAMPLES?		NO	
TESTS REQUESTED:	SPECIES OR EPA METH # C. dubia	ACUTE <input type="checkbox"/>	CHRONIC <input checked="" type="checkbox"/>
OTHER TESTS:	SPECIES OR EPA METH # P. promelas	ACUTE <input type="checkbox"/>	CHRONIC <input checked="" type="checkbox"/>

A SPECIFIC DILUTION SERIES MAY BE REQUIRED IN THE PERMIT. A DEFAULT SERIES OF 100, 50, 25, 12.5 AND 6.3%, OR CONCENTRATIONS USED IN PRIOR TESTING, WILL BE USED UNLESS INDICATED OTHERWISE. IF IN DOUBT PLEASE ATTACH A COPY OF APPLICABLE PERMIT PAGES.

GRAB SAMPLE INFORMATION

SAMPLE DATE	10-9-14	SAMPLE TIME	7:29	SAMPLE VOLUME	1 liter
-------------	---------	-------------	------	---------------	---------

COMPOSITE SAMPLE INFORMATION

SAMPLE START DATE & TIME	10-8-14 7:30am	SAMPLE END DATE & TIME	10-9-14 7:30am	AUTOSAMPLER TEMP. (°C)	2°C
TIME OR FLOW PROPORTIONAL COMPOSITE INFORMATION	NUMBER SUBSAMPLES	VOL (ml) SUBSAMPLES	TIME INCREMENT		
	48	200 ml	7		
	SET VOLUME SUBSAMPLE	SET VOLUME FLOW	TOTAL VOLUME		

FOR VARIABLE VOLUME SUBSAMPLES BASED ON FLOW (COMPOSITING "BY HAND") ATTACH SAMPLE AND FLOW INFORMATION ON SEPARATE SHEET

FIELD MEASUREMENTS

DISCHARGE TEMP (°C)	DISCHARGE pH (S.U.)	SAMPLE TEMP (°C)	SAMPLE pH (S.U.)	SAMPLE TRC (mg/l)	DATE/TIME (e.g. 02/23/00 1835)	INITIALS
22°C	7.5	22°C	7.5	N/A	10/9/14 7:39	JC

MEASUREMENTS MUST BE TAKEN WITHIN 15 MINUTES OF SAMPLE OR LAST SUBSAMPLE COLLECTION.

COMMENTS:

Jason Chapman
(PRINTED NAME/AFFILIATION SAMPLER/ANALYST) Jason Chapman
(SIGNATURE) 10-9-14
(DATE)

RELINQUISHED BY	DATE	TIME	RECEIVED BY
Kevin L. Tally	10-9-14	3:00 pm	
	10/10/14	0935	J. H.

SHIPPING METHOD: UPS _____ FEDEX ☒ HAND DELIVERY _____

DO NOT SHIP FEDEX STANDARD OVERNIGHT
SAMPLES MUST ARRIVE AT LAB BY NOON

CONDITION ON ARRIVAL: ACCEPTABLE ☒ OTHER _____

SAMPLE TEMP: (°C) 1 ARRIVED ON ICE? Y ☒ N _____ CUSTODY SEAL: INTACT ☒ BROKEN _____ ABSENT _____

NOTE: It is the responsibility of the sampler to insure that samples are properly collected, preserved (>0-6° C) and shipped. Sample hold time is 36 h. Additional costs may be incurred by improper preservation, shipping or receipt of samples after 3 p.m. or on weekends and holidays.

Attachment 14

1/28/2015 10:48:50 AM

Facility = Basham Simms - WET

Chemical = C. dubia

Chronic averaging period = 4

WLAa = 3

WLAc = 1

Q.L. = 1

samples/mo. = 1

samples/wk. = 1

Summary of Statistics:

observations = 10

Expected Value = 1

Variance = 0

C.V. = 0

97th percentile daily values = 1

97th percentile 4 day average = 1

97th percentile 30 day average = 1

< Q.L. = 0

Model used = lognormal

No Limit is required for this material

The data are:

1
1
1
1
1
1
1
1
1
1
1

1/28/2015 10:49:05 AM

Facility = Basham Simms - WET

Chemical = P. promelas

Chronic averaging period = 4

WLAa = 3

WLAc = 1

Q.L. = 1

samples/mo. = 1

samples/wk. = 1

Summary of Statistics:

observations = 10

Expected Value = 1

Variance = 0

C.V. = 0

97th percentile daily values = 1

97th percentile 4 day average = 1

97th percentile 30 day average = 1

< Q.L. = 0

Model used = lognormal

No Limit is required for this material

The data are:

1
1
1
1
1
1
1
1
1
1
1

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	
2	Spreadsheet for determination of WET test endpoints or WET limits															
4	Excel 97			Acute Endpoint/Permit Limit			Use as LC ₅₀ in Special Condition, as TU _a on DMR									
5	Revision Date: 12/13/13															
6	File: WETLIM10.xls			ACUTE	100% =	NOAEC	LC ₅₀ =	NA	% Use as	NA	TU _a					
7	(MIX.EXE required also)															
8				ACUTE WLA _a	0.3	Note: Inform the permittee that if the mean of the data exceeds this TU _a :										
9							1.0	a limit may result using STATS.EXE								
11				Chronic Endpoint/Permit Limit			Use as NOEC in Special Condition, as TU _c on DMR									
13				CHRONIC	1.46257468	TU _c	NOEC =	69	% Use as	1.44	TU _c					
14				BOTH*	3.00000007	TU _c	NOEC =	34	% Use as	2.94	TU _c					
15	Enter data in the cells with blue type:			AML	1.46257468	TU _c	NOEC =	69	% Use as	1.44	TU _c					
17	Entry Date:	01/28/15	ACUTE WLA _{a,c}			3	Note: Inform the permittee that if the mean of the data exceeds this TU _c :									
18	Facility Name:	Basham Simms	CHRONIC WLA _c			1	a limit may result using STATS.EXE									
19	VPDES Number:	VA0022802	* Both means acute expressed as chronic													
20	Outfall Number:	1														
22	Plant Flow:	1.5 MGD	% Flow to be used from MIX.EXE			Diffuser /modeling study?										
23	Acute 1Q10:	0 MGD	100 %	Enter Y/N												
24	Chronic 7Q10:	0 MGD	100 %	Acute												
25				Chronic												
26	Are data available to calculate CV? (Y/N)			N	(Minimum of 10 data points, same species, needed)							Go to Page 2				
27	Are data available to calculate ACR? (Y/N)			N	(NOEC<LC50, do not use greater/less than data)							Go to Page 3				
30	IWC _a	100 %	Plant flow/plant flow + 1Q10	NOTE: If the IWC _a is >33%, specify the												
31	IWC _c	100 %	Plant flow/plant flow + 7Q10	NOAEC = 100% test/endpoint for use												
33	Dilution, acute	1	100/IWC _a													
34	Dilution, chronic	1	100/IWC _c													
36	WLA _a	0.3	Instream criterion (0.3 TU _a) X's Dilution, acute													
37	WLA _c	1	Instream criterion (1.0 TU _c) X's Dilution, chronic													
38	WLA _{a,c}	3	ACR X's WLA _a - converts acute WLA to chronic units													
40	ACR -acute/chronic ratio	10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)													
41	CV-Coefficient of variation	0.6	Default of 0.6 - if data are available, use tables Page 2)													
42	Constants	eA	0.4109447	Default = 0.41												
43		eB	0.6010373	Default = 0.60												
44		eC	2.4334175	Default = 2.43												
45		eD	2.4334175	Default = 2.43 (1 samp)												
46				No. of sample	1	**The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTA _{a,c} and MDL using it are driven by the ACR.										
47	LTA _{a,c}	1.2328341	WLA _{a,c} X's eA													
48	LTA _c	0.6010373	WLA _c X's eB													
49	MDL** with LTA _{a,c}	3.000000074	TU _c	NOEC =	33.333333	(Protects from acute/chronic toxicity)					NOEC =	34	%			
50	MDL** with LTA _c	1.462574684	TU _c	NOEC =	68.372577	(Protects from chronic toxicity)					NOEC =	69	%			
51	AML with lowest LTA	1.462574684	TU _c	NOEC =	68.372577	Lowest LTA X's eD					NOEC =	69	%			
53	IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU _c to TU _a															
54												Rounded LC50's	%			
55	MDL with LTA _{a,c}	0.300000007	TU _a	LC50 =	333.333325	%					Use NOAEC=100%	LC50 =	NA	%		
56	MDL with LTA _c	0.146257468	TU _a	LC50 =	683.725769	%					Use NOAEC=100%	LC50 =	NA	%		

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
139	Page 2 - Follow the directions to develop a site specific CV (coefficient of variation)														
140															
141															
142	IF YOU HAVE AT LEAST 10 DATA POINTS THAT						Vertebrate	Invertebrate							
143	ARE QUANTIFIABLE (NOT "<" OR ">")						IC ₂₅ Data	IC ₂₅ Data							
144	FOR A SPECIES, ENTER THE DATA IN EITHER						or	or							
145	COLUMN "G" (VERTEBRATE) OR COLUMN						LC ₅₀ Data	LN of data	LC ₅₀ Data		LN of data				
146	"J" (INVERTEBRATE). THE 'CV' WILL BE						*****	*****							
147	PICKED UP FOR THE CALCULATIONS						1			1					
148	BELOW. THE DEFAULT VALUES FOR eA,						2			2					
149	eB, AND eC WILL CHANGE IF THE 'CV' IS						3			3					
150	ANYTHING OTHER THAN 0.6.						4			4					
151							5			5					
152							6			6					
153							7			7					
154	Coefficient of Variation for effluent tests						8			8					
155							9			9					
156	CV = 0.6 (Default 0.6)						10			10					
157							11			11					
158	$\delta^2 = 0.3074847$						12			12					
159	$\delta = 0.554513029$						13			13					
160							14			14					
161	Using the log variance to develop eA						15			15					
162	(P. 100, step 2a of TSD)						16			16					
163	Z = 1.881 (97% probability stat from table)						17			17					
164	A = -0.88929666						18			18					
165	eA = 0.410944686						19			19					
166							20			20					
167	Using the log variance to develop eB														
168	(P. 100, step 2b of TSD)						St Dev	NEED DATA	NEED DATA	St Dev	NEED DATA	NEED DATA			
169	$\delta_s^2 = 0.086177696$						Mean	0	0	Mean	0	0			
170	$\delta_s = 0.293560379$						Variance	0	0.000000	Variance	0	0.000000			
171	B = -0.50909823						CV	0		CV	0				
172	eB = 0.601037335														
173															
174	Using the log variance to develop eC														
175	(P. 100, step 4a of TSD)														
176															
177	$\delta^2 = 0.3074847$														
178	$\delta = 0.554513029$														
179	C = 0.889296658														
180	eC = 2.433417525														
181															
182	Using the log variance to develop eD														
183	(P. 100, step 4b of TSD)														
184	n = 1 This number will most likely stay as "1", for 1 sample/month.														
185	$\delta_n^2 = 0.3074847$														
186	$\delta_n = 0.554513029$														
187	D = 0.889296658														
188	eD = 2.433417525														
189															

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	
110																
111		Page 3 - Follow directions to develop a site specific ACR (Acute to Chronic Ratio)														
112																
113		To determine Acute/Chronic Ratio (ACR), insert usable data below. Usable data is defined as valid paired test results,														
114		acute and chronic, tested at the same temperature, same species. The chronic NOEC must be less than the acute														
115		LC ₅₀ , since the ACR divides the LC ₅₀ by the NOEC. LC ₅₀ 's > 100% should not be used.														
116																
117		Table 1. ACR using Vertebrate data								Convert LC₅₀'s and NOEC's to Chronic TU's						
118										for use in WLA.EXE						
119										ACR used: 10						
120		Set #	LC₅₀	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use							
121		1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA		Enter LC₅₀	TUc	Enter NOEC	TUc		
122		2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA	1		NO DATA		NO DATA		
123		3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA	2		NO DATA		NO DATA		
124		4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA	3		NO DATA		NO DATA		
125		5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA	4		NO DATA		NO DATA		
126		6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA	5		NO DATA		NO DATA		
127		7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA	6		NO DATA		NO DATA		
128		8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA	7		NO DATA		NO DATA		
129		9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA	8		NO DATA		NO DATA		
130		10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA	9		NO DATA		NO DATA		
131										10		NO DATA		NO DATA		
132										11		NO DATA		NO DATA		
133										12		NO DATA		NO DATA		
134										13		NO DATA		NO DATA		
135										14		NO DATA		NO DATA		
136										15		NO DATA		NO DATA		
137										16		NO DATA		NO DATA		
138										17		NO DATA		NO DATA		
139										18		NO DATA		NO DATA		
140										19		NO DATA		NO DATA		
141										20		NO DATA		NO DATA		
142		Set #	LC₅₀	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use							
143		1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
144		2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
145		3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
146		4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
147		5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
148		6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
149		7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
150		8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
151		9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
152		10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
153																
154																
155																
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162																
163																
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165																
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167																
168																
169																
170																
171																
172																

DILUTION SERIES TO RECOMMEND					
Table 4.		Monitoring		Limit	
		% Effluent	TUc	% Effluent	TUc
	Dilution series based on data mean	100	1.0		
	Dilution series to use for limit			69	1.4492754
	Dilution factor to recommend:	0.5		0.8306624	
	Dilution series to recommend:	100.0	1.00	100.0	1.00
		50.0	2.00	83.1	1.20
		25.0	4.00	69.0	1.45
		12.5	8.00	57.3	1.74
		6.25	16.00	47.6	2.10
	Extra dilutions if needed	3.12	32.05	39.5	2.53
		1.56	64.10	32.9	3.04

Cell: I9

Comment: This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: K18

Comment: This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: J22

Comment: Remember to change the "N" to "Y" if you have ratios entered, otherwise, they won't be used in the calculations.

Cell: C40

Comment: If you have entered data to calculate an ACR on page 3, and this is still defaulted to "10", make sure you have selected "Y" in cell E21

Cell: C41

Comment: If you have entered data to calculate an effluent specific CV on page 2, and this is still defaulted to "0.6", make sure you have selected "Y" in cell E20

Cell: L48

Comment: See Row 151 for the appropriate dilution series to use for these NOEC's

Cell: G62

Comment: Vertebrates are:
Pimephales promelas
Oncorhynchus mykiss
Cyprinodon variegatus

Cell: J62

Comment: Invertebrates are:
Ceriodaphnia dubia
Mysidopsis bahia

Cell: C117

Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

Cell: M119

Comment: The ACR has been picked up from cell C34 on Page 1. If you have paired data to calculate an ACR, enter it in the tables to the left, and make sure you have a "Y" in cell E21 on Page 1. Otherwise, the default of 10 will be used to convert your acute data.

Cell: M121

Comment: If you are only concerned with acute data, you can enter it in the NOEC column for conversion and the number calculated will be equivalent to the TUa. The calculation is the same: $100/\text{NOEC} = \text{TUc}$ or $100/\text{LC50} = \text{TUa}$.

Cell: C138

Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

Attachment 15

Public Notice – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of treated wastewater into a water body in Loudoun County, Virginia.

PUBLIC COMMENT PERIOD: XXX, 2015 to XXX, 2015

PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Wastewater issued by DEQ, under the authority of the State Water Control Board

APPLICANT NAME, ADDRESS AND PERMIT NUMBER: Town of Purcellville, 221 S. Nursery Ave, Purcellville, VA 20132, VA0022802

NAME AND ADDRESS OF FACILITY: Basham Simms Wastewater Treatment Facility (WWTF), 1001 South 20th St, Purcellville, VA 20132

PROJECT DESCRIPTION: The Town of Purcellville has applied for a reissuance of a permit for the public Basham Simms WWTF. The applicant proposes to release treated sewage wastewaters from residential areas and non-contaminated storm water at a rate of 1.5 million gallons per day into a water body. The sludge will be disposed by land application by an approved contractor. The facility proposes to release the treated sewage and non-contaminated stormwater in an unnamed tributary to North Fork Goose Creek in Loudoun County in the Potomac River watershed. A watershed is the land area drained by a river and its incoming streams. The permit will limit the following pollutants to amounts that protect water quality: CBOD₅, Total Suspended Solids, Total Kjeldahl Nitrogen, Ammonia as Nitrogen, Total Nitrogen, Total Phosphorus, Dissolved Oxygen, E. coli, pH, and Total Recoverable Copper. The facility will monitor without limitation the following pollutants: Flow, Nitrate+Nitrite, Total Hardness, Total Recoverable Selenium, and Bis(2-ethylhexyl)phthalate.

This facility is subject to the requirements of 9VAC25-820 and has registered for coverage under the General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Watershed in Virginia.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by hand-delivery, e-mail, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION: The public may review the draft permit and application at the DEQ-Northern Regional Office by appointment, or may request electronic copies of the draft permit and fact sheet.

Name: Alison Thompson

Address: DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193

Phone: (703) 583-3834 E-mail: Alison.Thompson@deq.virginia.gov Fax: (703) 583-3821